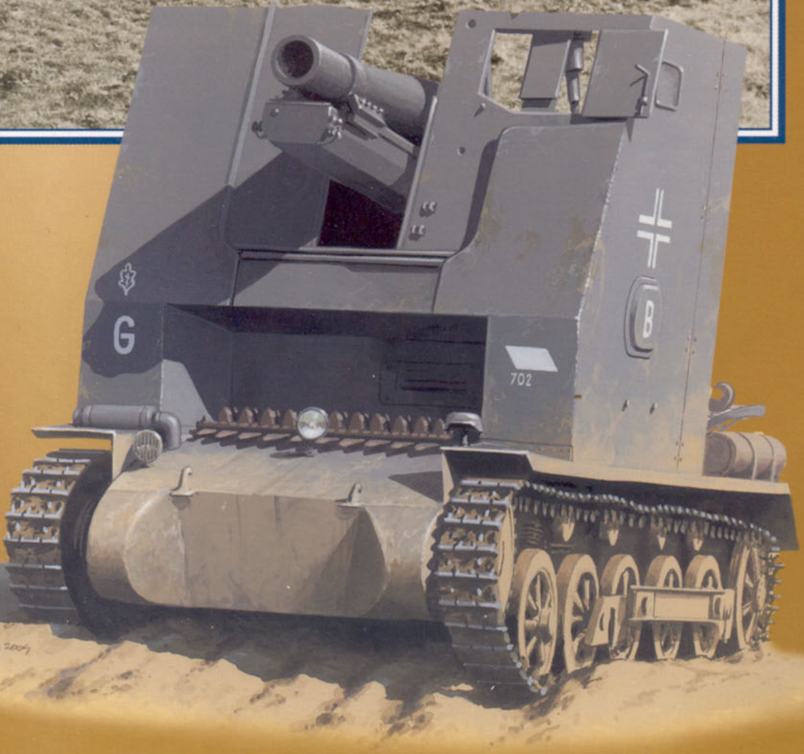
ARMOR AT WAR SERIES

7022

# GERMAN SELF-PROPELLED GUNS

## Self-propelled artillery anti-tank and anti-aircraft guns

Gordon Rottman



CONCORD
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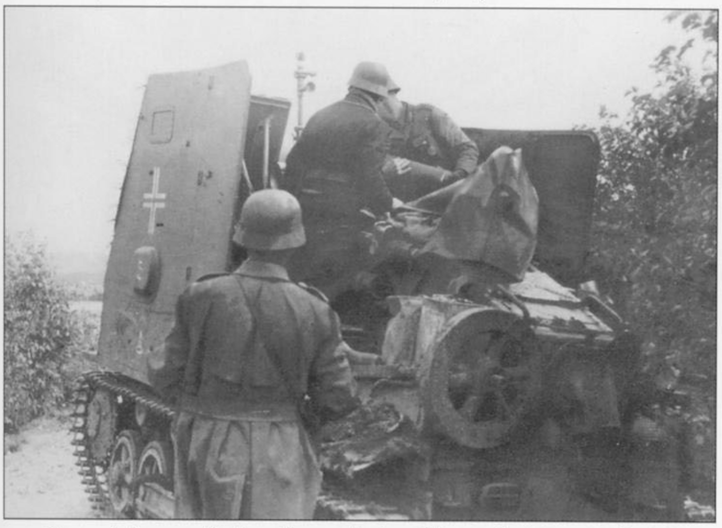
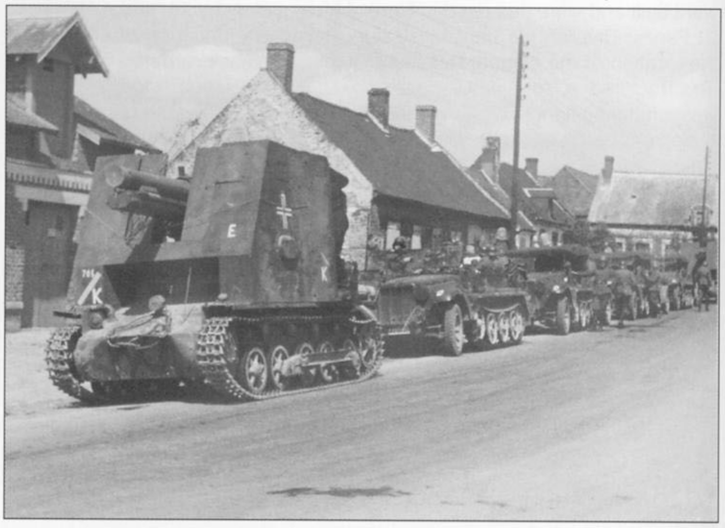
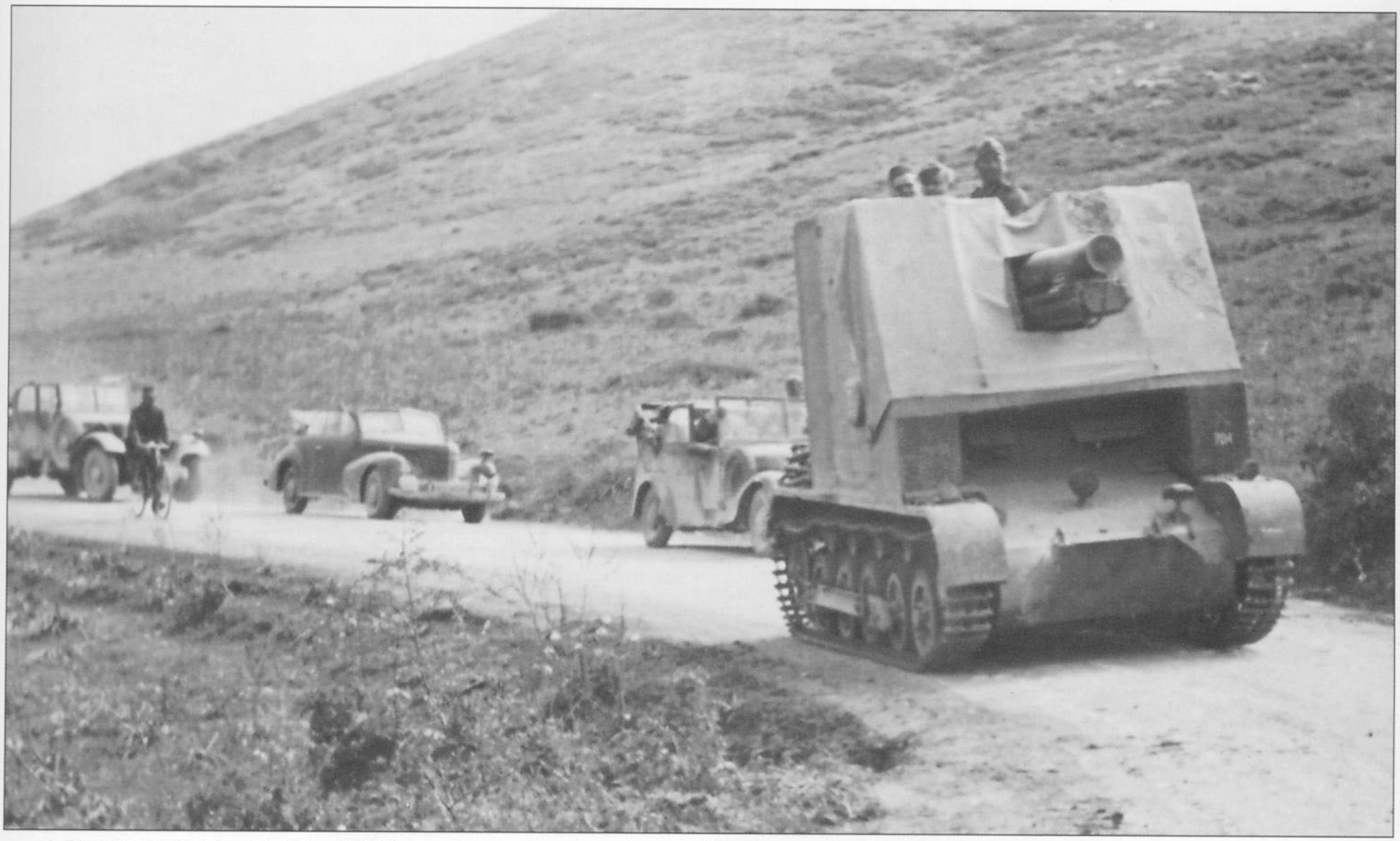
# Self-propelled Artillery (Selbstfahrlafette-Artillerie, Panzer-Artillerie)



One of the earliest self-propelled artillery pieces was the 15cm s.I.G.33/1(Sf.) auf Pz.Kpfw.I Ausf.B or 'Bison' I (Sd.Kfz.101). The boxy 10mm thick superstructure was extremely high (3.5 meters) and gun added 6,000 pounds (2,700 kilograms) resulting in a top-heavy vehicle with poor cross-country mobility. It had a five-man crew, two of whom rode in an accompanying Sd.Kfz.10 half-track carrying extra ammunition. Ammunition was carried in the support vehicle as only three ready rounds could be carried aboard the 'Bison'. The 15cm s.I.G.33/1 infantry gun was mounted on a Pz.Kpfw.I Ausf.B tank chassis on its normal carriage. Only 38 of these vehicles were converted in early 1940 and employed with infantry gun companies (Infanterie-Geschütz-Kompanie) in France, Russia, and the Balkans until withdrawn in late 1943. These companies were normally attached to Panzer divisions. This 'Bison' I displays four insignia on its dark gray side (from top to bottom):- narrow white outline Balkenkreuz (no black), white "5" for the gun number, dark yellow 1.Panzer-Division insignia (inverted Y), and a white tactical unit symbol. Soviet Union, August 1941.

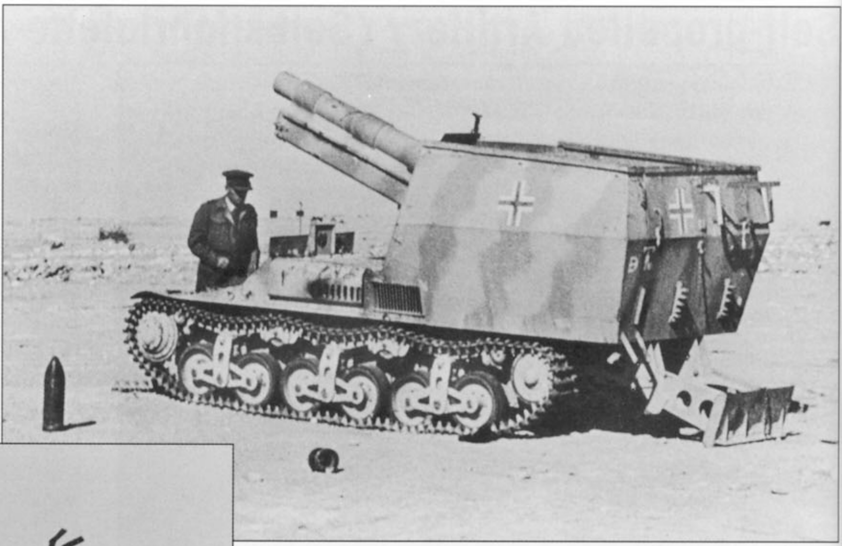


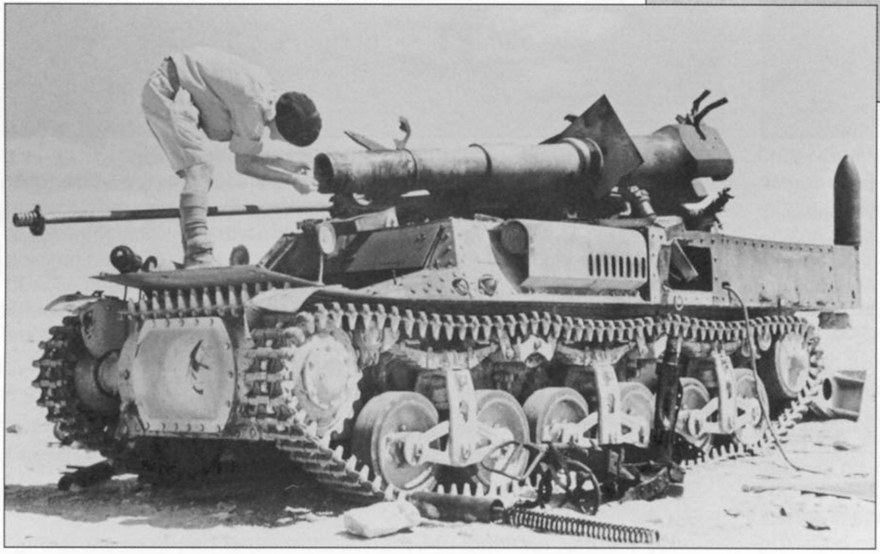
A 'Bison' I awaits order to move further into a French town, 1940. This 706.Infanterie-Geschütz-Kompanie 'Bison' is painted dark gray. The white "K" identifies it as belonging to Panzergruppe von Kleist (later redesignated Panzergruppe 1). The white "E" indicates it is the fifth gun within the battery. The guns were identified A through F. Note the tunnel-like recessed opening beneath the gun. This provided the driver with a field of vision and allowed for an overhang of the gun compartment to provide much needed room for the crew and gun. Unarmored Sd.Kfz.10 personnel carrier halftracks are lined up behind the 'Bison' with another 'Bison' bringing up the rear.



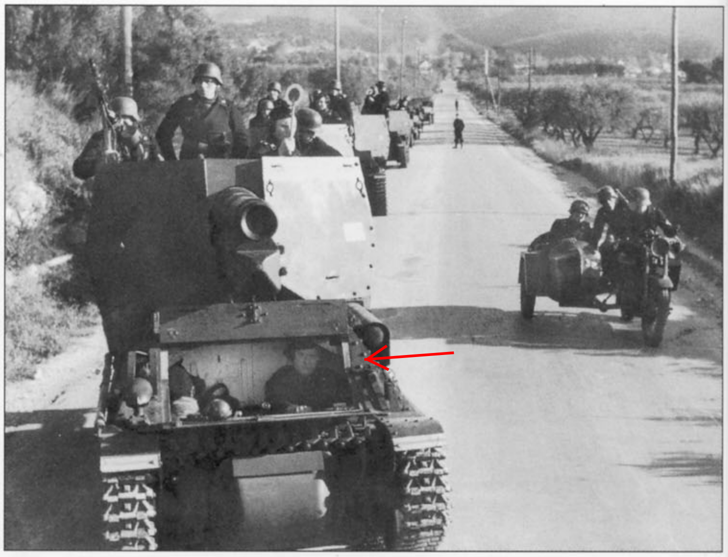
A 'Bison' I of 704.Infanterie-Geschütz-Kompanie passes an assortment of headquarters vehicles. The crew has fabricated a tarp to help keep dust out of the gun port and the muzzle plug is in-place. Most self-propelled guns used canvas muzzle covers rather than plugs. Even through travel with the muzzle protected, standard procedure required the crew to visually inspecting the bore to ensure there were no obstructions before firing.

Ninety-four 15cm s.F.H.13/1(Sf.) auf Geschützwagen Lorraine Schlepper(f) self-propelled howitzers (Sd.Kfz.135/1) were built and were first used in North Africa, mainly by 15. and 21.Panzer-Division. Its unusual design, necessary because of the location of the engine, resulted in a distinct rear overhang. This required a retractable spade be fitted to support the weapon during firing. The howitzer had a very limited traverse of 5 degrees left and right with a 40-degree elevation. Twelve similar vehicles were built mounting 10.5cm le.F.H.18/40 L/28 field howitzers. The camouflage pattern appears to be sand over-painted on dark gray. The white D-like symbol with a horizontal bar, the divisional emblem of 21.Panzer-Division can be seen below and to the left of the rear Balkenkreuz.

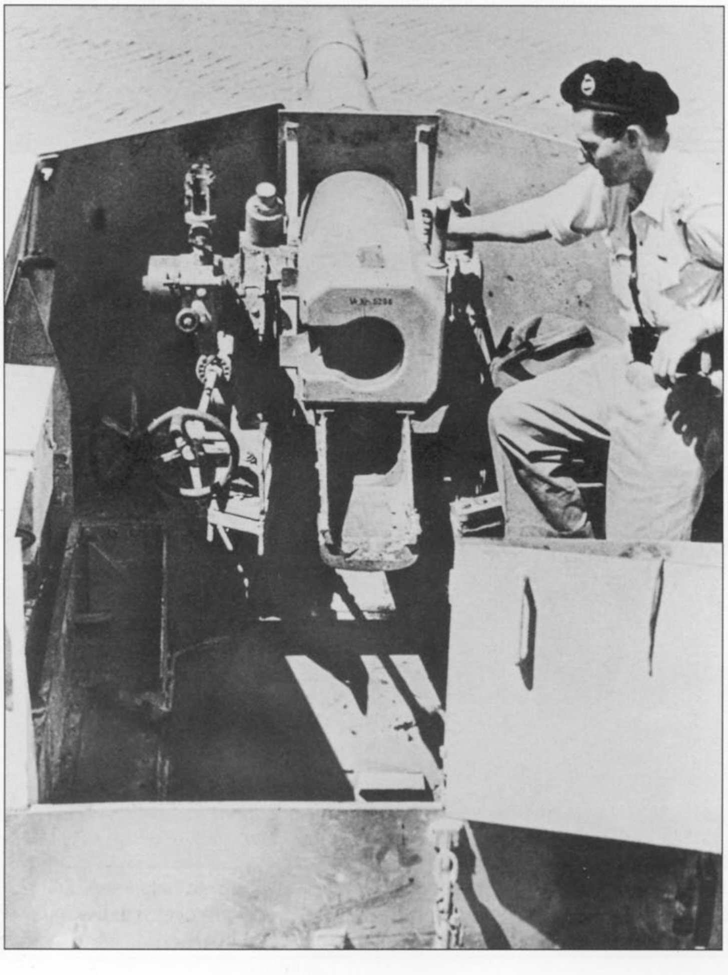




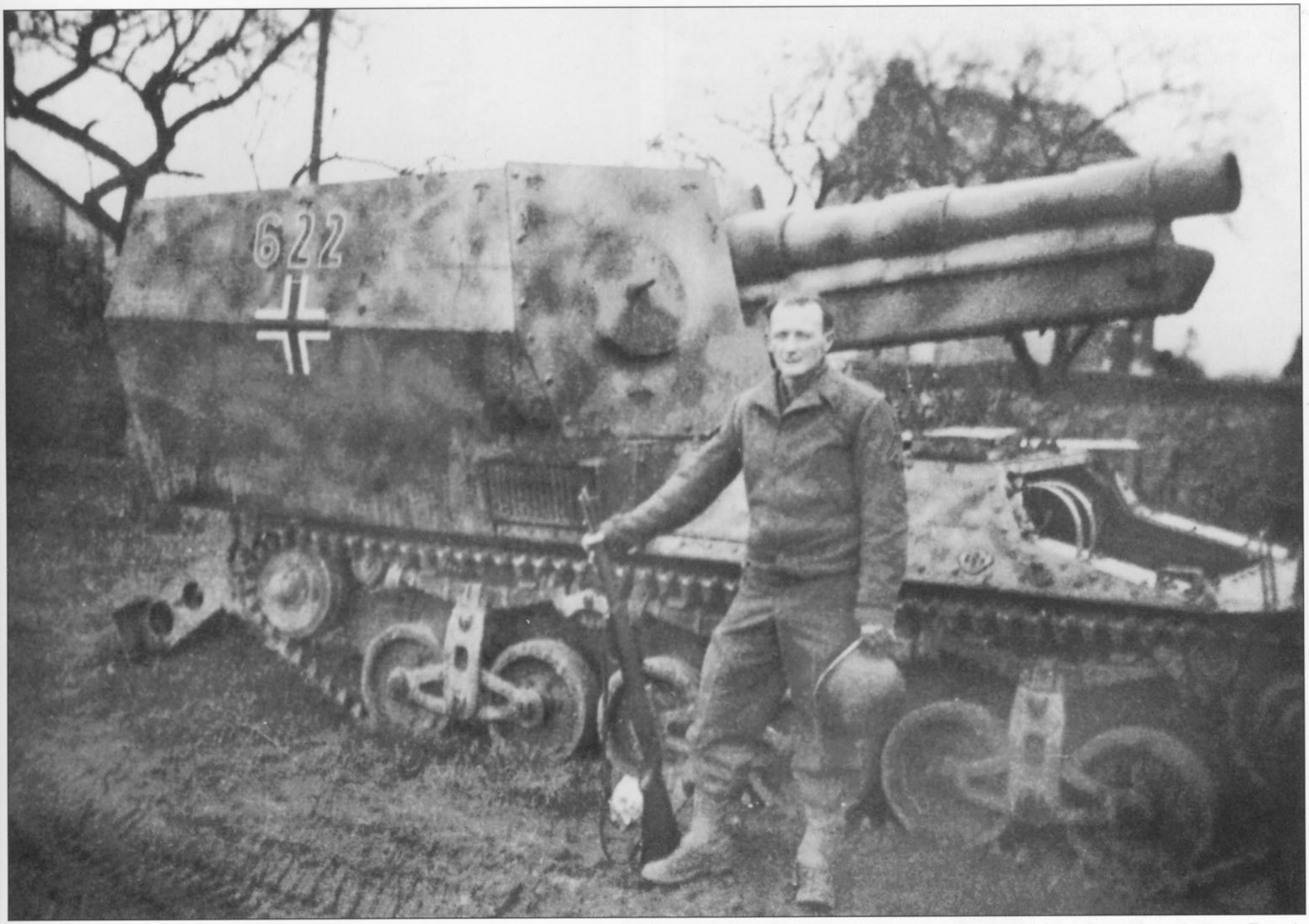
A British soldier measures the caliber of a 15cm Sd.Kfz.135/1 with its superstructure blown off, probably from propellant and some projectiles detonating. The blackened traversing mechanism rests on the ground by the middle set of bogie wheels. An unexploded high explosive projectile had been set on the vehicle's left rear. It was manned by a crew of four and could carry only eight rounds.



The driver's compartment of this Sd.Kfz.135/1 is open with its split shutters opening upward and downward. Note the 7.92mm MG-34 machine gun with an antiaircraft sight mounted on the right front of its superstructure. From the front his vehicle can be confused with the more common 'Bison' I Sd.Kfz.101 mounting a 15cm infantry gun in its high, boxier superstructure.

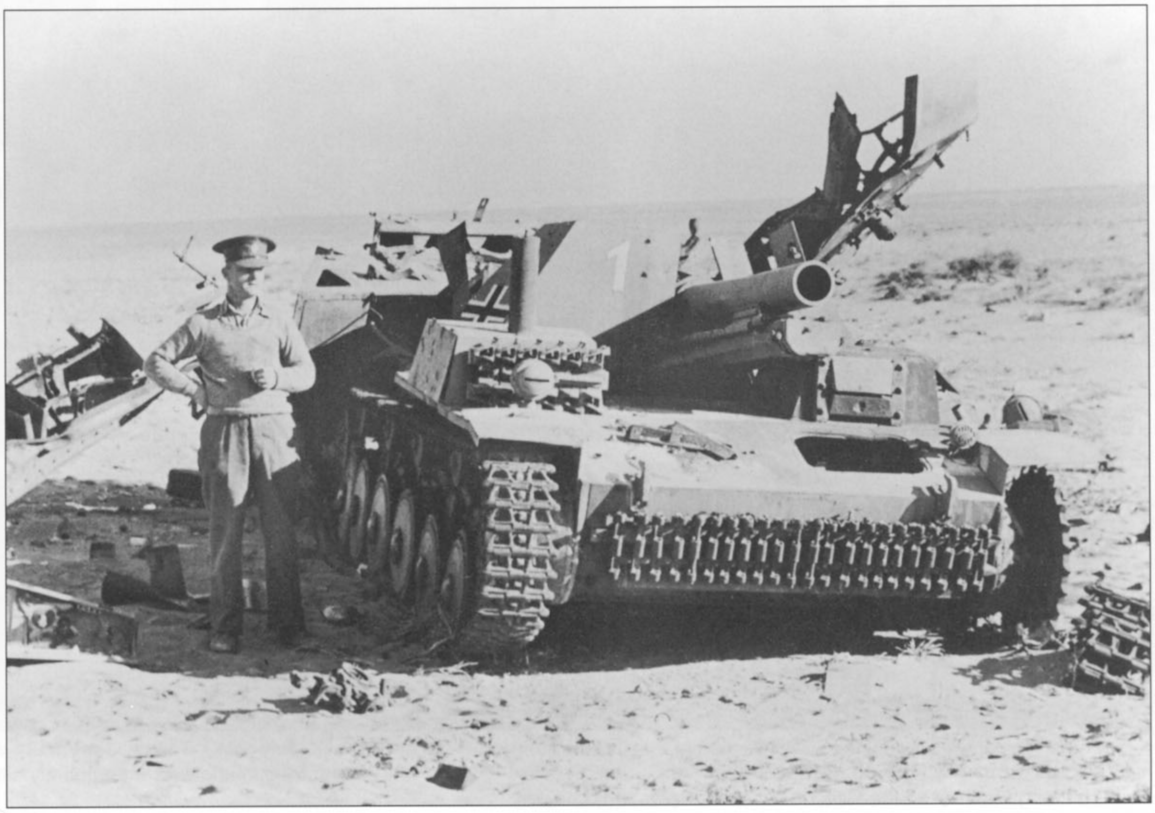


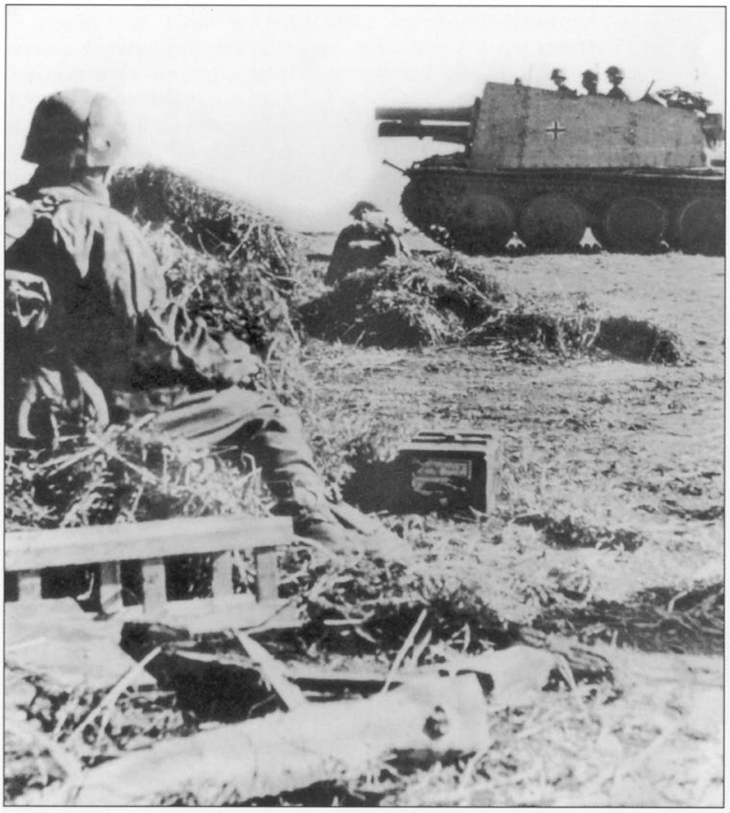
The interior of the 15cm s.F.H.13/1(Sf.) Sd.Kfz.135/1 self-propelled heavy field howitzer in North Africa is being inspected by a British officer. The 15cm s.F.H.13 L/17 was adopted in 1917 and continued to serve in a secondary role into World War II. While considered an obsolescent weapon, it was of good design and provided effective service with a range of 6,780 yards (6,200 meters).



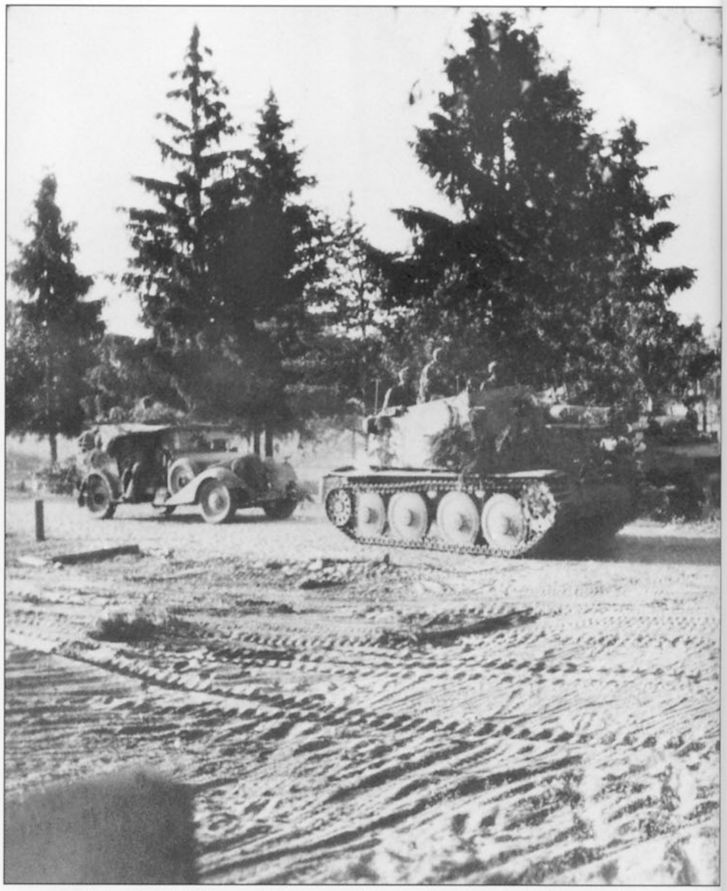
A small number of 15cm s.F.H.13/1(Sf.) auf Geschützwagen Lorraine Schlepper(f) Sd.Kfz.135/1 self-propelled heavy field howitzers were built on French Lorraine tractor chassis. Initially, they were assigned to two heavy infantry gun regiments with six assigned to a battery. These two regiments were later disbanded and their guns distributed among the infantry and Panzer divisions in the west. The camouflage is probably olive green and red brown mottled over dark yellow. An American infantryman poses before this example in France, 1944.

This 15cm s.I.G.33 auf Fahrgestell Pz.Kpfw.II (Sf.), or incorrectly, 'Bison' II, is surveyed by a British officer in North Africa, where all 12 examples built served with the 707. and 708.schwere Infanteriegeschütze-Kompanien. A 15cm s.I.G.33 L/12 heavy infantry gun was mounted on a slightly widened and lengthened Pz.Kpfw.II chassis resulting in the addition of a sixth road wheel. This gun had a 75-degree elevation. Only 10 rounds could be carried on-board and it had a crew of four. Unlike most other German self-propelled artillery pieces, the 'Bison' II had a low profile, but its crew protection was inadequate. Its cross-country mobility was poor, mainly because the original engine was retained resulting in it being underpowered. Lessons learned from the 'Bison' II and earlier 15cm self-propelled infantry guns resulted in the 10.5cm 'Wespe'.

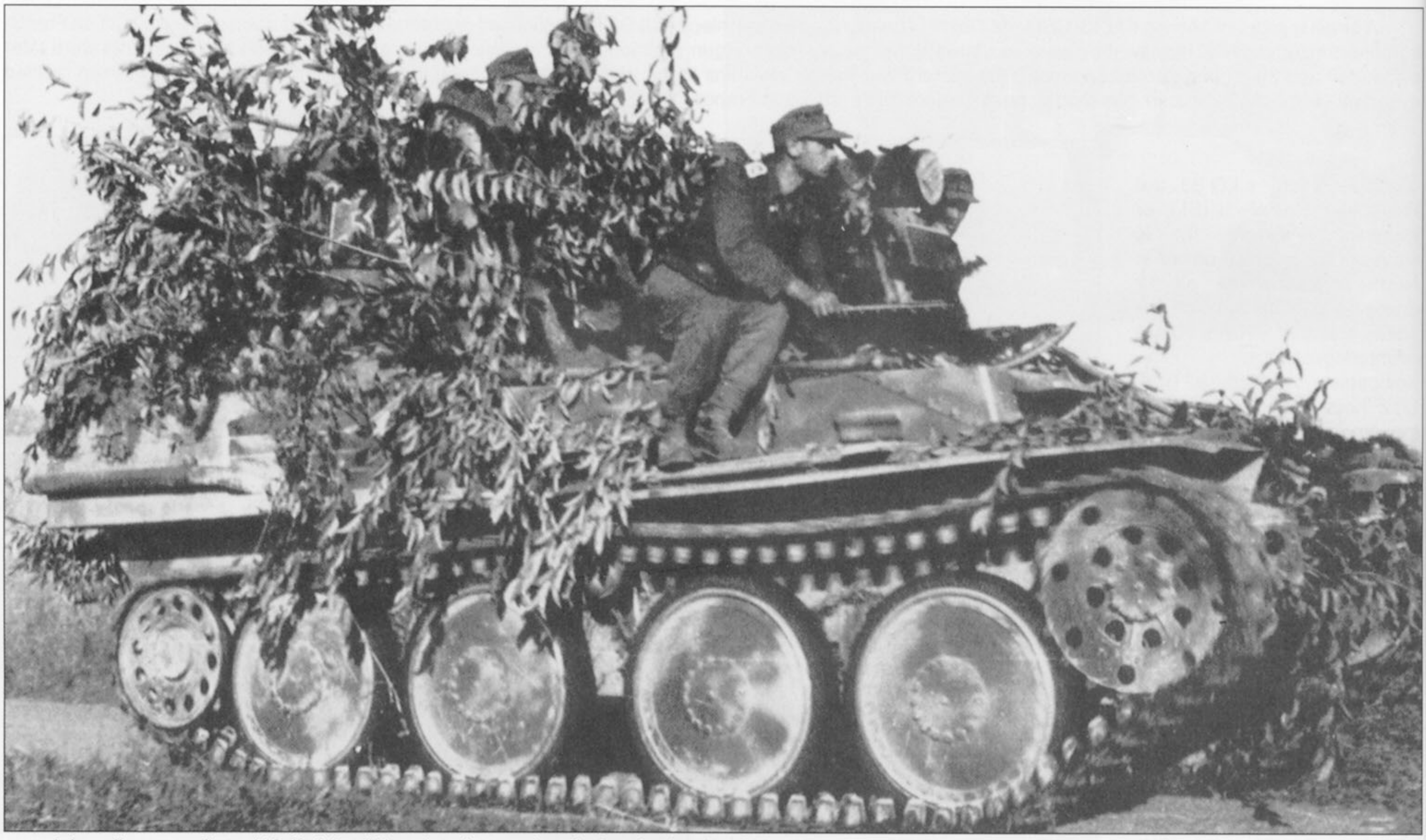




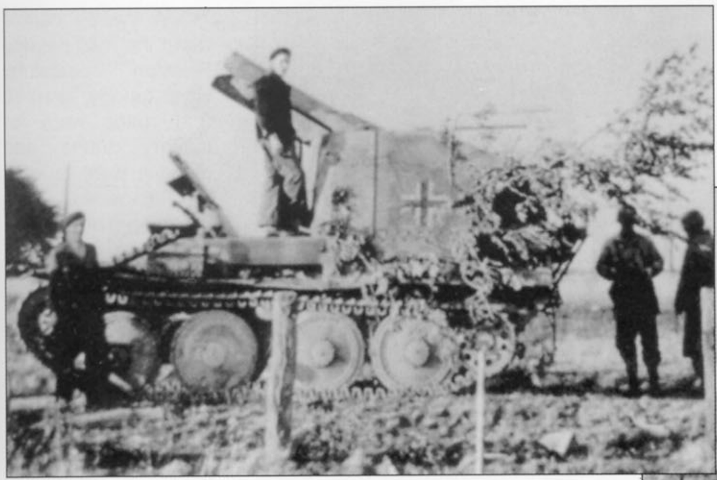
The 15cm s.I.G.33(Sf.) auf Pz.Kpfw.38(t) 'Grille' Ausf.H (Cricket), (Sd.Kfz.138/1) was built on the Pz.Kpfw.38(t) chassis. It mounted a 15cm s.I.G.33/1 L/12 infantry gun. Also incorrectly called a 'Bison', they were produced in limited numbers, but saw service in all theaters assigned to Panzergrenadier regiments. It had a crew of five and was provided an MG-34 carried in the gun compartment. This gun moves forward in support of Panzergrenadiers in Russia. This vehicle is a solid dark yellow without any camouflage over-painting.



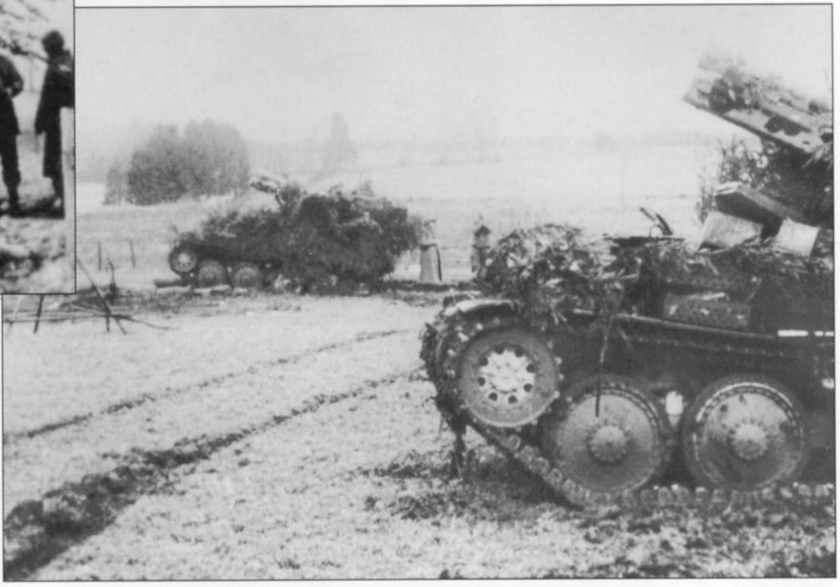
A 'Grille' Ausf.H from 4.Panzer-Division in Russia is followed by one of scores of types of light trucks employed by the Germans. So long as at least 150 vehicles of given type of vehicle were available and it was remotely useful for military service, they were commandeered and issued to rear service units.



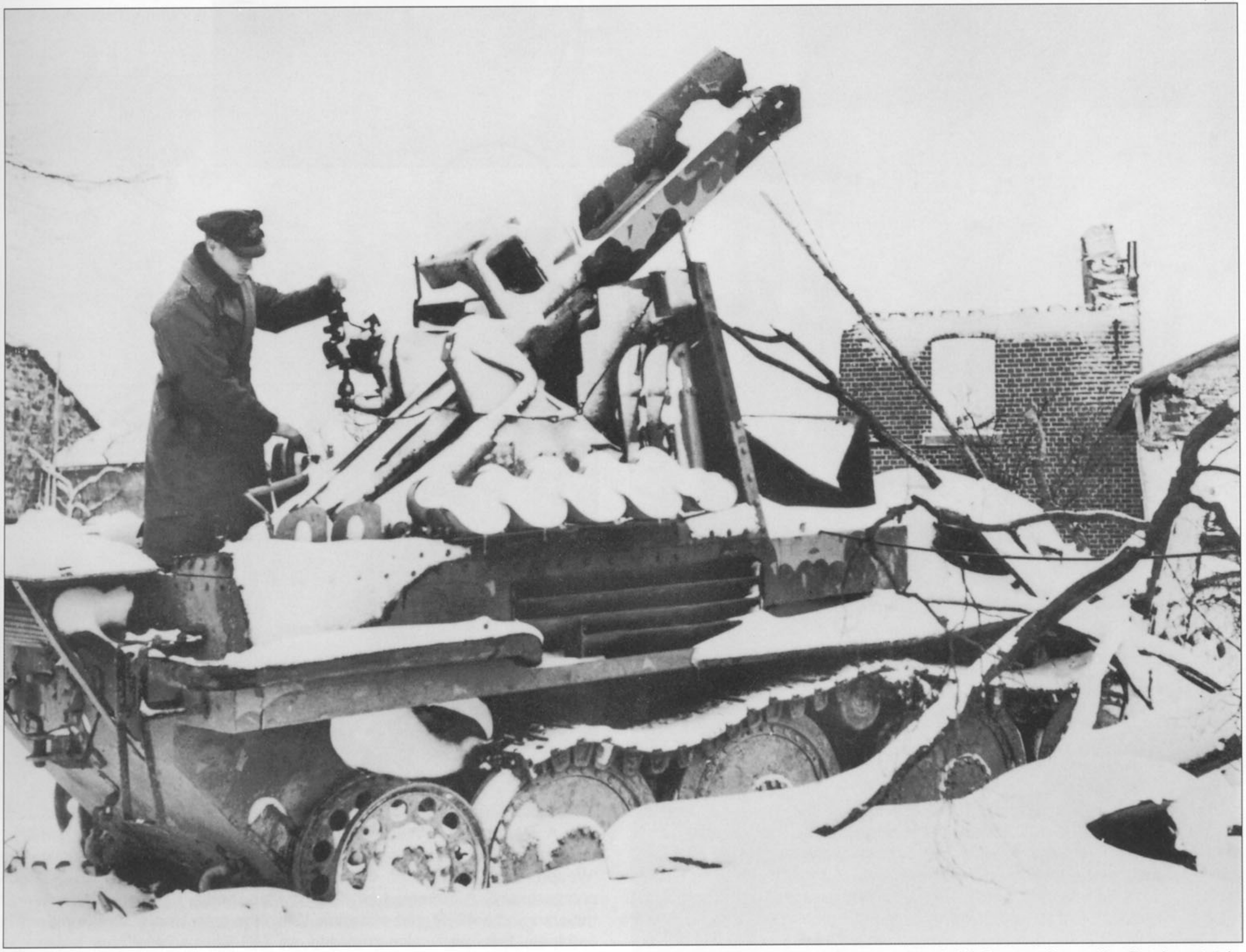
A heavily camouflaged 'Grille' Ausf.K rushes into action during the battle of Kursk, July 1943. This was a variant of the Marder III Sd.Kfz.138, which mounted a 7.62cm gun. The Sd.Kfz.138/1 Ausf.K mounted a 15cm s.F.H.33/1 heavy infantry gun and was of an entirely different design than the Sd.Kfz.138/1 Ausf.H, though both used the Czechoslovak Pz.Kpfw.38(t) chassis.



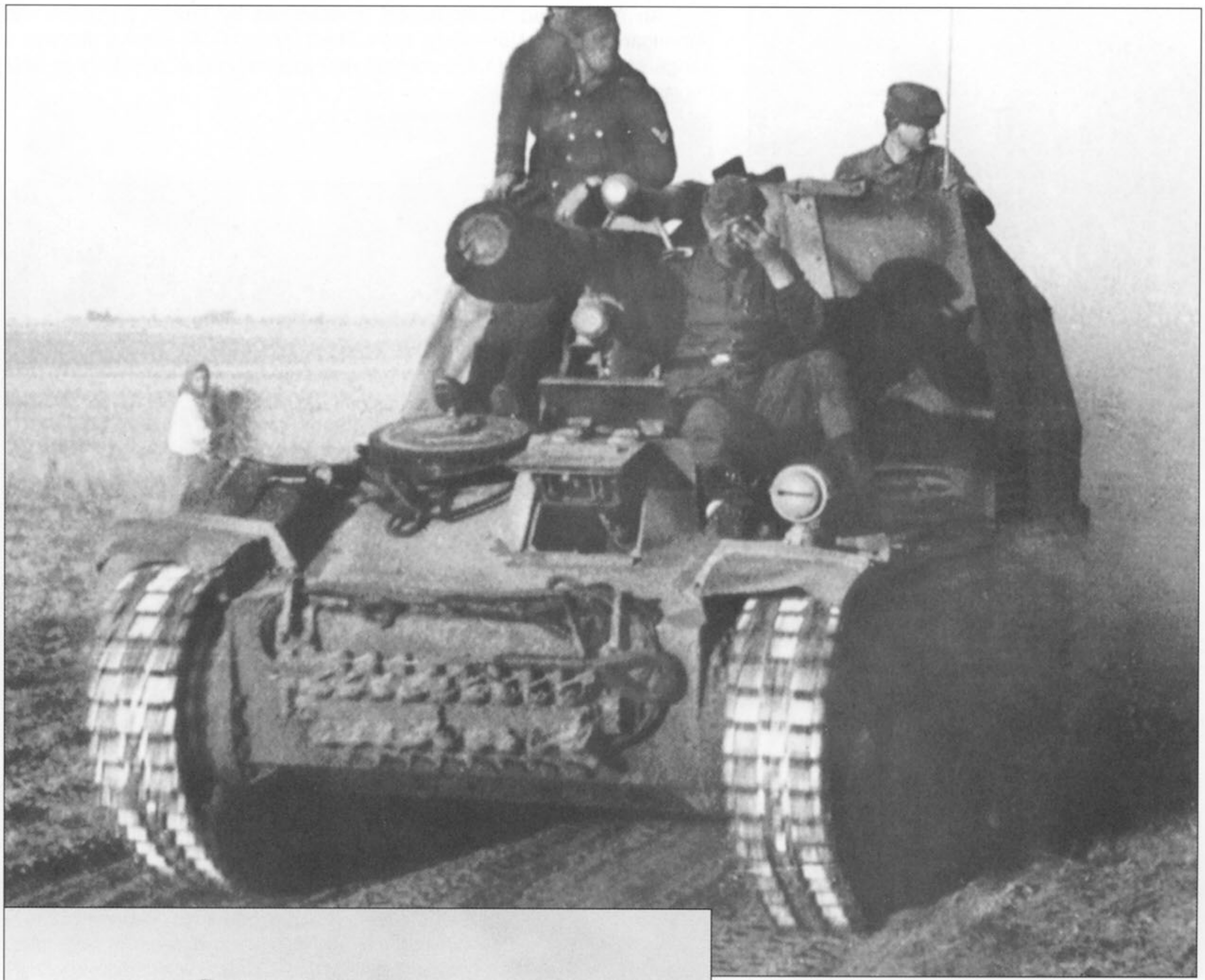
An abandoned 'Grille' Ausf.K is examined by French partisans and American soldiers, Normandy, 1944. The 15cm s.I.G.33 infantry gun had a range of 5,140 yards (4,700 meters) and was capable of direct fire or near mortar-like indirect fire.



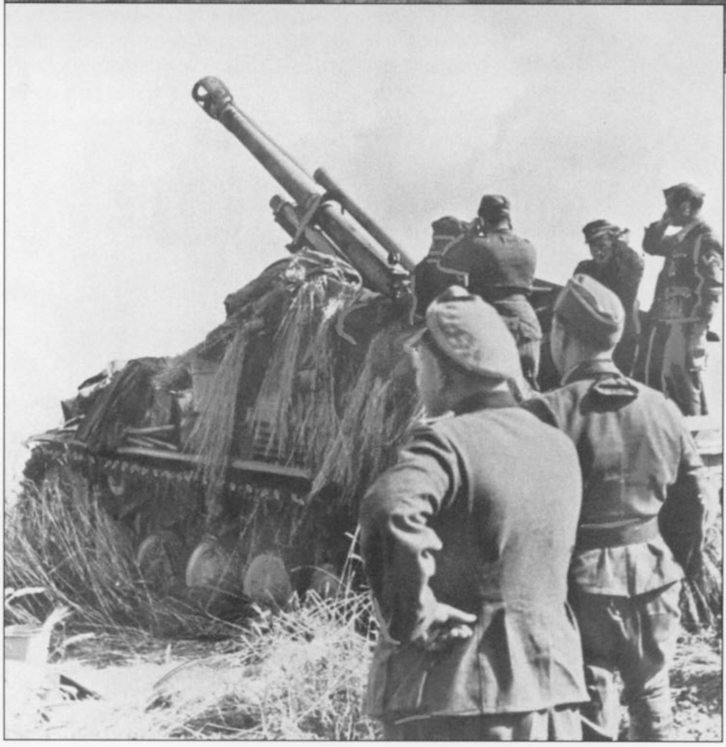
A pair of heavily camouflaged 'Grille' Ausf.K self-propelled guns occupy firing positions in a mist-shrouded field. The 15cm s.I.G.33 infantry gun could fire 5-7 rounds per minute. Both high explosive and smoke rounds were available. It had a crew of five.



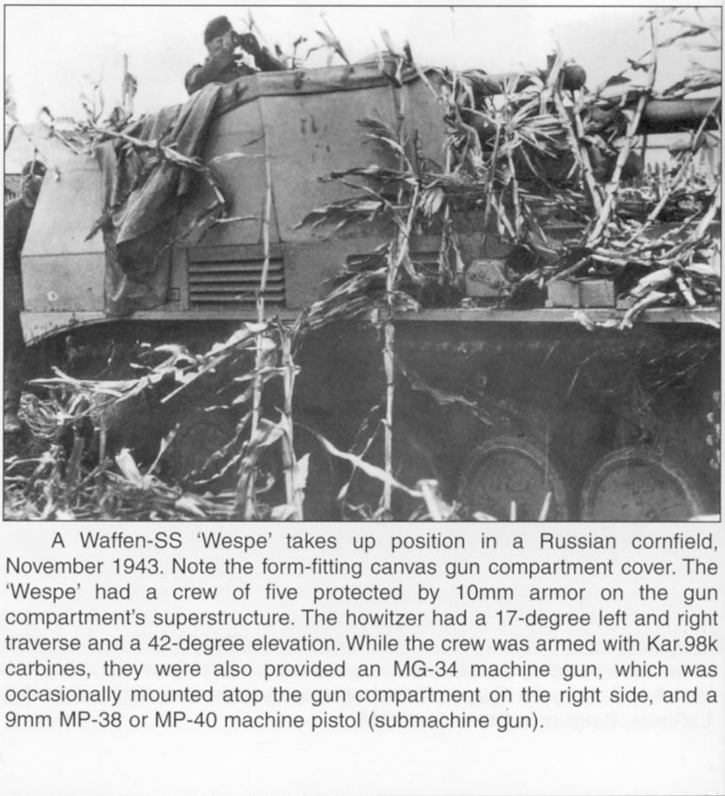
A U.S. Army Air Corps officer inspects a knocked out 'Grille' Ausf.K that was abandoned by 13.(IG)Kompanie of SS-Panzer-Grenadier-Regiment 2 in LaGleize, Belgium in December 1944.



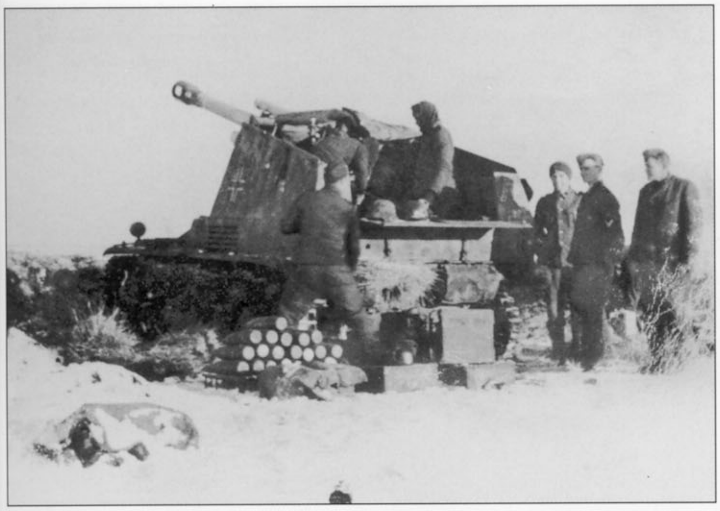
A 'Wespe' barrels down the road passing Russian peasants, who quickly learned that roads were for military traffic and civilians were to keep to the sides. Even weighing over 12 tons and considered overloaded for its Maybach 6 cylinder gasoline engine, a 'Wespe' could hit 25 miles per hour (40 kilometer per hour). Such high speeds were only undertaken when absolutely necessary though because of the rapid wear on engines, transmissions, tracks, and running gear.



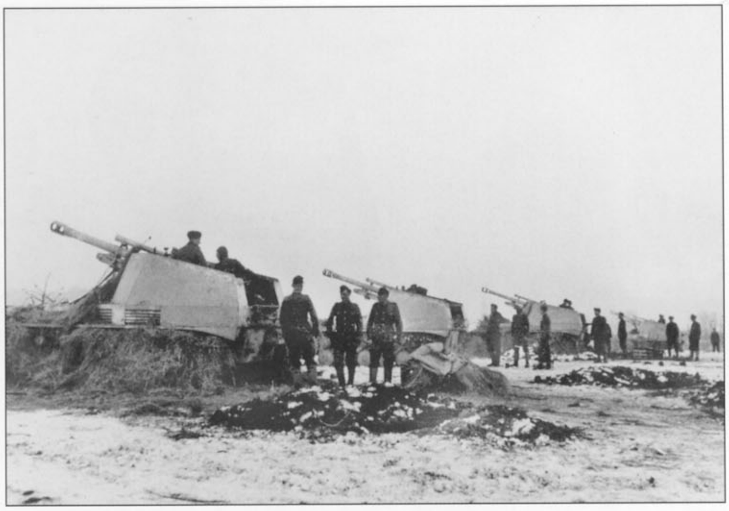
A 'Wespe' cracks out rounds at Soviet positions. The 10.5cm le.F.H.18/2 Fahrgestell auf Geschützwagen Pz.Kpfw.II or 'Wespe' (Wasp) was also known as the leichte Feldhaubitze 18/2 auf Fahrgestell Pz.Kpfw.II (Sf.) (Sd.Kfz.124). The 'Wespe' mounted a le.F.H.18/2, the same as used as towed artillery in divisional artillery regiments. The 'Wespe' was built on a Pz.Kpfw.II Ausf.F chassis modified by relocating the engine in a central position to allow space for the gun compartment. A total of 676 were built in 1943-44. This vehicle has been fairly well camouflaged with bundles of wheat. The oval object behind the neck of the foreground officer to the right is a leather binocular eyepiece cover used when the binoculars were slung around the neck and were not protected by its case. It was commonly slid on the strap out of the way behind the neck.



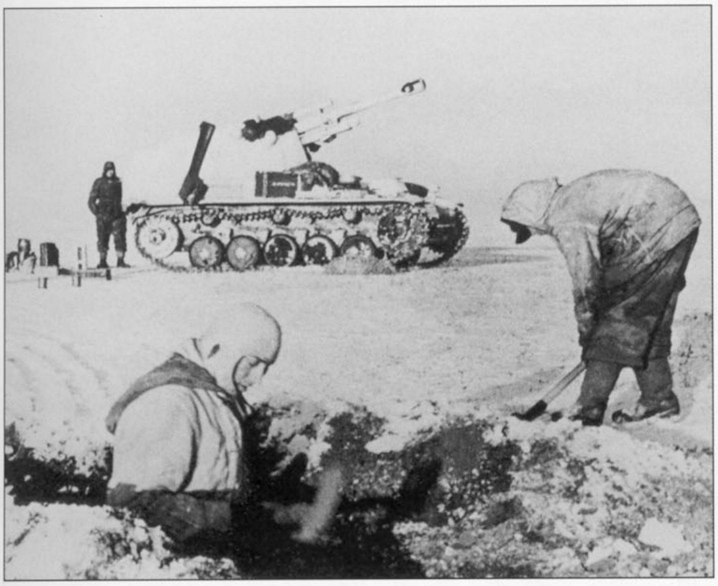
A Waffen-SS 'Wespe' takes up position in a Russian cornfield, November 1943. Note the form-fitting canvas gun compartment cover. The 'Wespe' had a crew of five protected by 10mm armor on the gun compartment's superstructure. The howitzer had a 17-degree left and right traverse and a 42-degree elevation. While the crew was armed with Kar.98k carbines, they were also provided an MG-34 machine gun, which was occasionally mounted atop the gun compartment on the right side, and a 9mm MP-38 or MP-40 machine pistol (submachine gun).



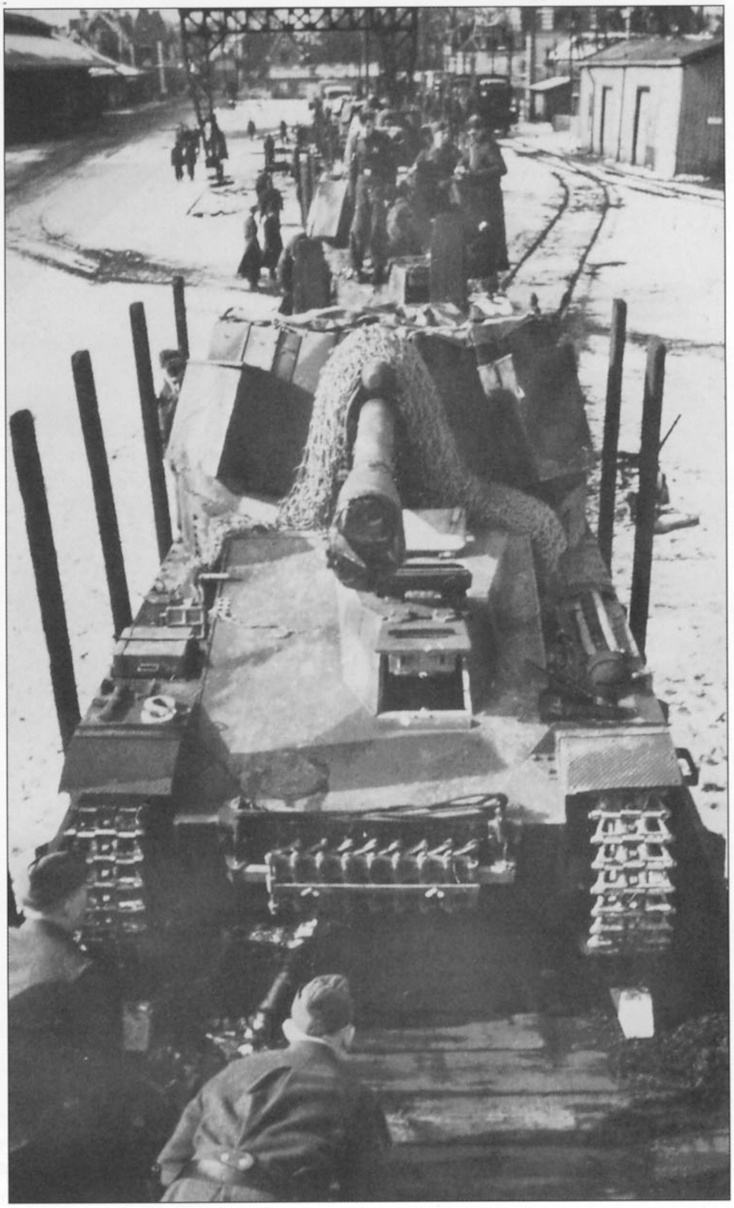
Though it is winter, the 'Wespe' has retained its normal camouflage. Judging by the relatively light clothing the crew is wearing; this may be elsewhere in a milder climate than deep in Russia. The armored 'Wespe' protected the crew from some degree of counterbattery fire, but its mobility was more advantageous to its survival. The full-tracked chassis allowed it to keep better pace with the panzers they supported and allowed them to occupy firing positions that may have been unreachable by even half-track-towed artillery. Ammunition included high explosive, high explosive-incendiary, and smoke. Additional ammunition was carried in the Munitions Sf. auf Fgst. Pz.Kpfw.II, or Munitionsschlepper 'Wespe', full-tracked carrier, two per battery. Only 159 of these were built and most 'Wespe' batteries were supported by 5-tonne Sd.Kfz.6 half-tracks or simply cargo trucks.



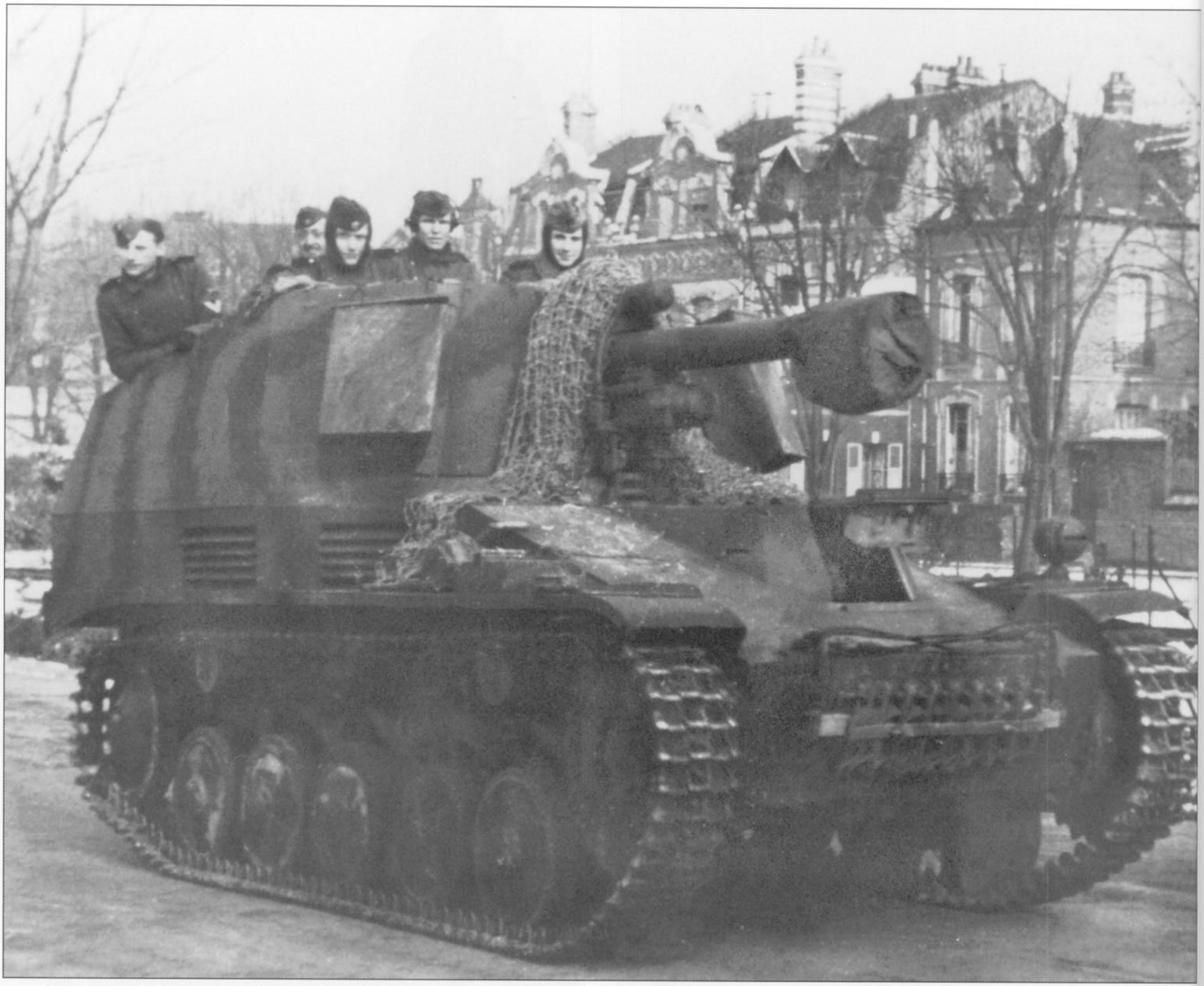
A 'Wespe' battery in a close firing position. While six guns were authorized per battery, it was not uncommon for fewer to be available. These guns have been whitewashed. Slit trenches for the crews have been dug immediately behind each gun. There appears to be little concern for Soviet counterbattery fire since the guns are positioned so closely together and in a neat formation. The tight formation also allows the guns to deliver a close concentration on a small target without having to adjust the angle of each guns' fire in a more dispersed formation.



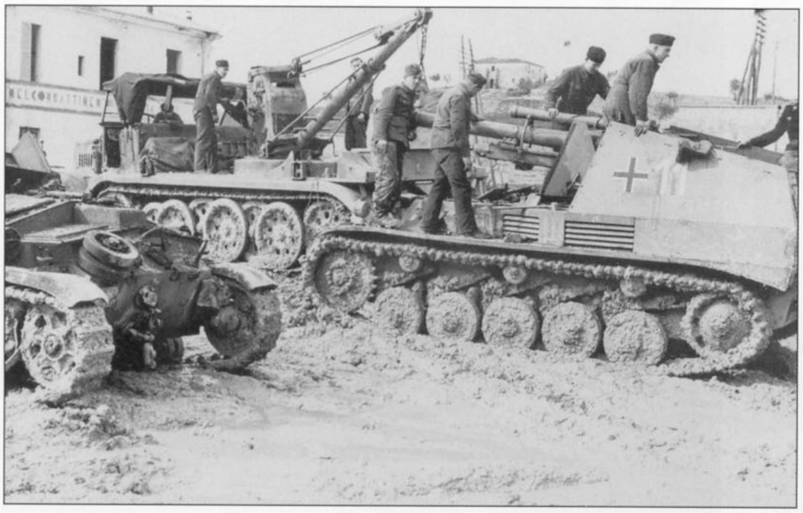
A 'Wespe' crew prepares a position on a barren Russian steppe. There were no natural terrain features or vegetation to provide cover and concealment. The frozen ground made it impossible to dig the gun in. Even small slit trenches for crew protection often had to be blasted by demolition charges. Note that slit trenches were not dug immediately beside the gun in order to achieve dispersal. All that could be done for concealment was to whitewash the vehicles and for troops to wear snow camouflage. This crew wears the insulated reversible winter uniform issued for the winter of 1942/43. The crewman in the foreground wears a padded skullcap issued with the uniform in addition to its integral hood.

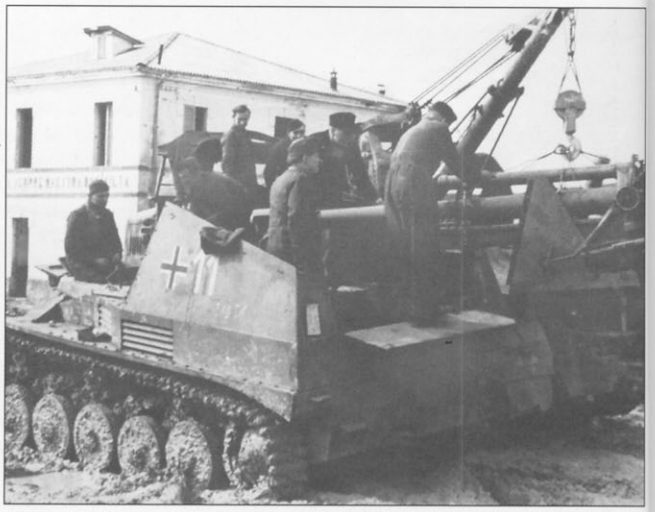


'Wespe' as well as all other vehicles crews became adept at securing their vehicles for rail transport, the most common means of long distant movement. The crews of this unit have fastened two open-topped sheet metal boxes on the forward sides of their 'Wespe' superstructures for equipment storage.

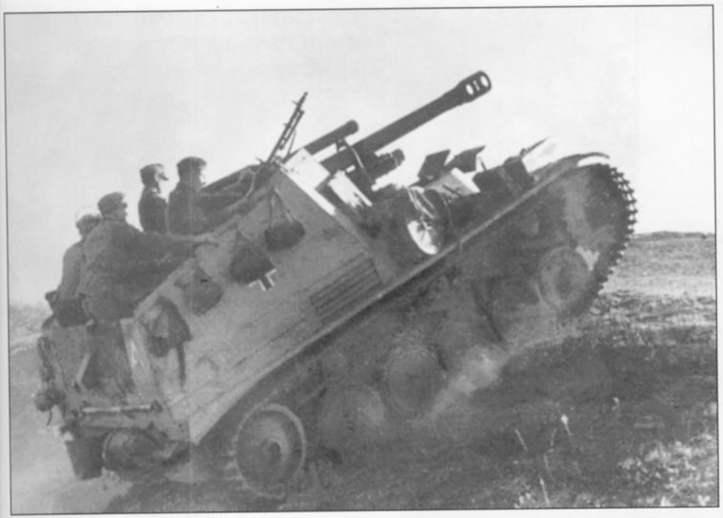


Obviously a winter scene, this 'Wespe' rumbles through a French town. This camouflage pattern appears to be dark green over the dark gray base. While the bands are of somewhat irregular form, their even spacing and width makes this a less than effective pattern. A camouflage net is draped over the howitzer barrel allowing it to be pulled forward and rearward to quickly cover the vehicle. The louvered vents on the hull sides are for the centrally mounted engine's ventilation.

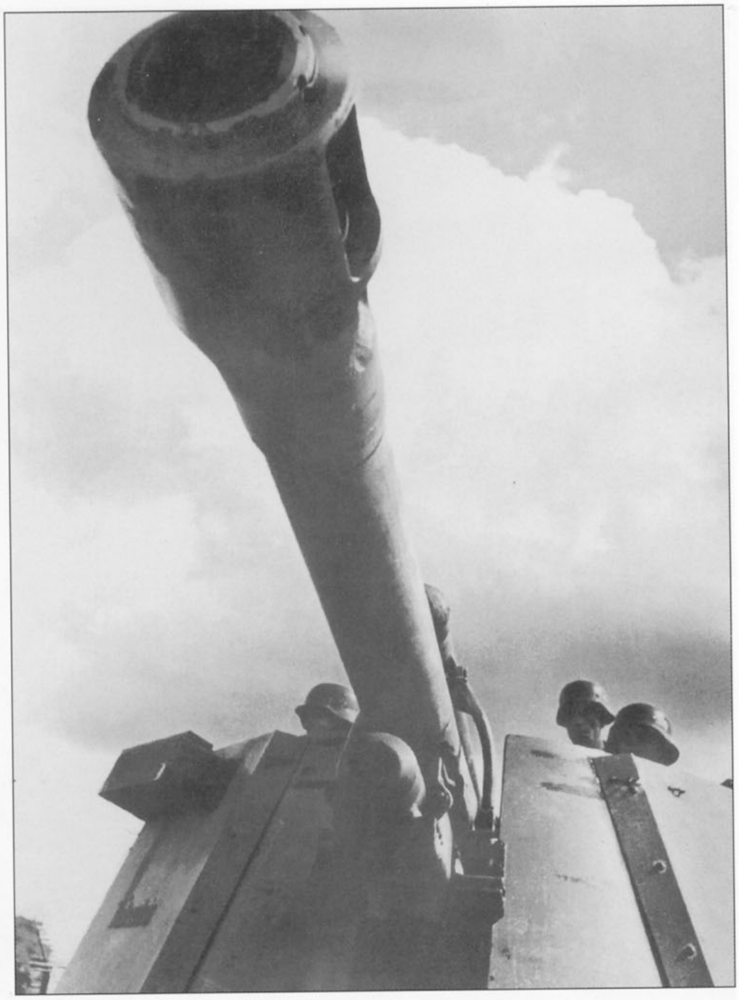




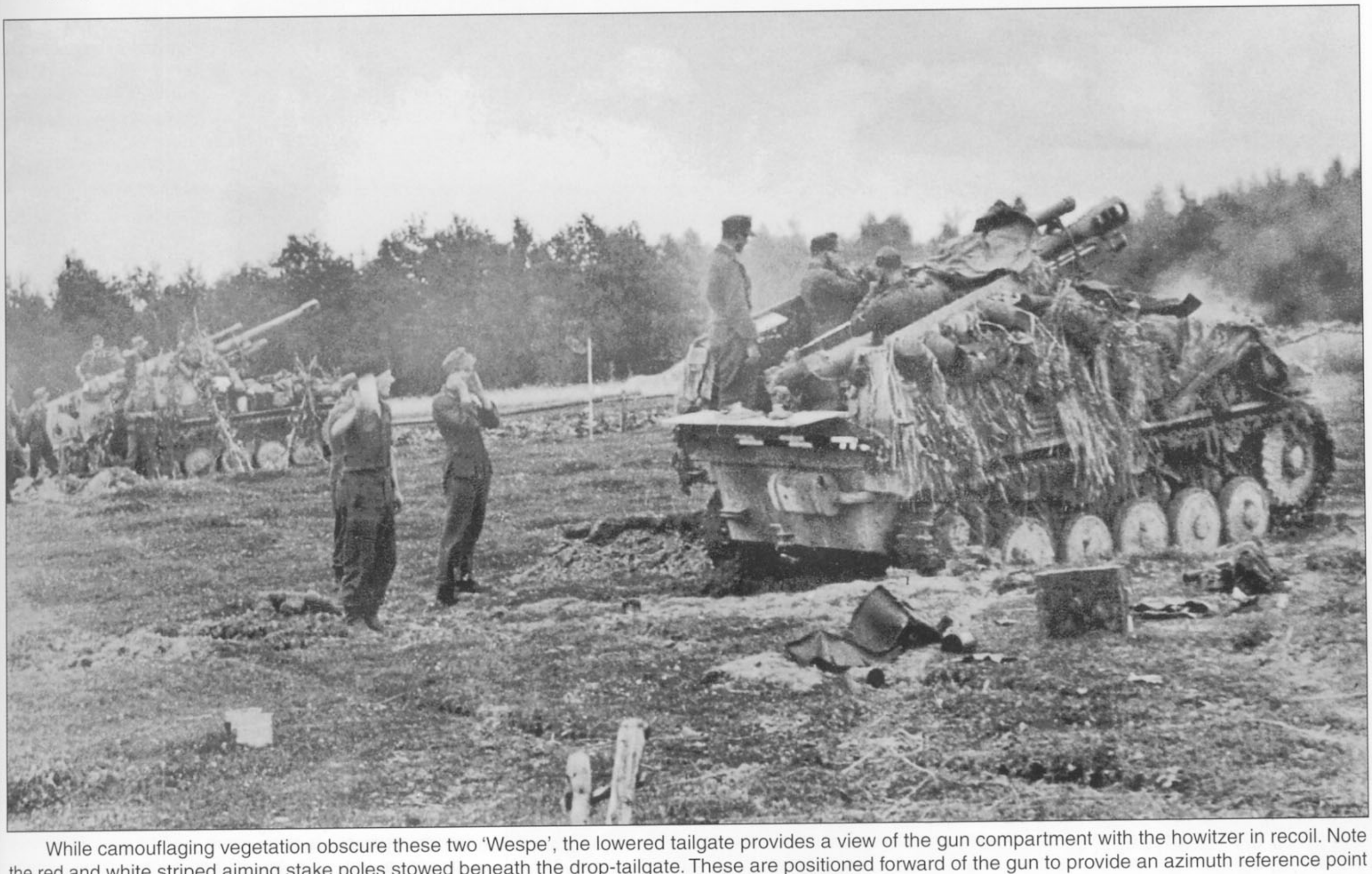
The motor park of an artillery battalion's workshop company would immediately be churned into a mud bath after even a light rain as this scene in Italy. Here a 'Wespe' crew replaces the worn-out 10.5cm howitzer. A Sd.Kfz.9/1 heavy half-track mounting a 6-ton Bilstein crane assists. The 18-ton capacity half-track, without crane, was used as a prime mover for heavy artillery and engineer equipment. Tactical number systems for self-propelled artillery were different than that used by tank units. The white "11" identifies Number 1 gun, 1st Battery. The rear end of the vehicle to the left is either an Italian Semovente da 75/18 assault gun or a M13/40 medium tank.



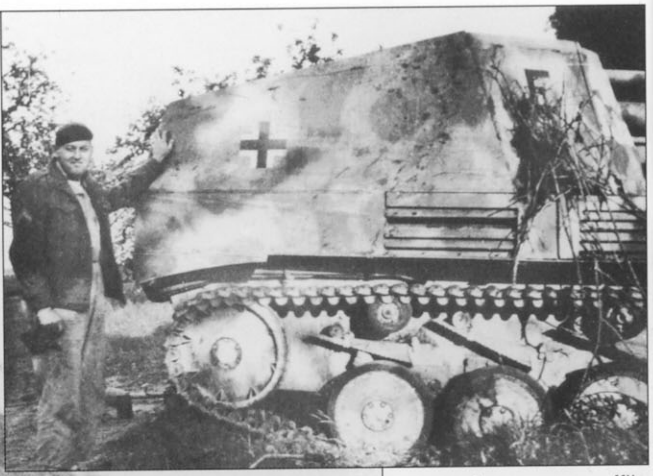
A 'Wespe', its MG-34 mounted, churns its way up a ravine side. The crew has slung their bread bags (containing rations and small personal items) on a wire attached to the superstructure's side. The crewman at the left wears radio headphones. This particular vehicle is gun "A" of a battery.



It is sometimes difficult to differentiate between the 10.5cm 'Wespe' and the 15cm "Hummel" if the muzzle brake cannot be seen, which the "Hummel" lacked. The 10.5cm howitzer has a curved support bracket just behind the barrel recoil cylinder; the 15cm lacks this bracket. The muzzle brake of the 10.5cm le.F.H.18/2 L/28 is evident here. The use of the muzzle brake, also found on the towed 10.5cm le.F.H.18 (M) (M = Mundungbremse—muzzle brake) field howitzer, allowed a more powerful propellant change extending the range by almost 2,000 meters. Soviet Union, July 1944.



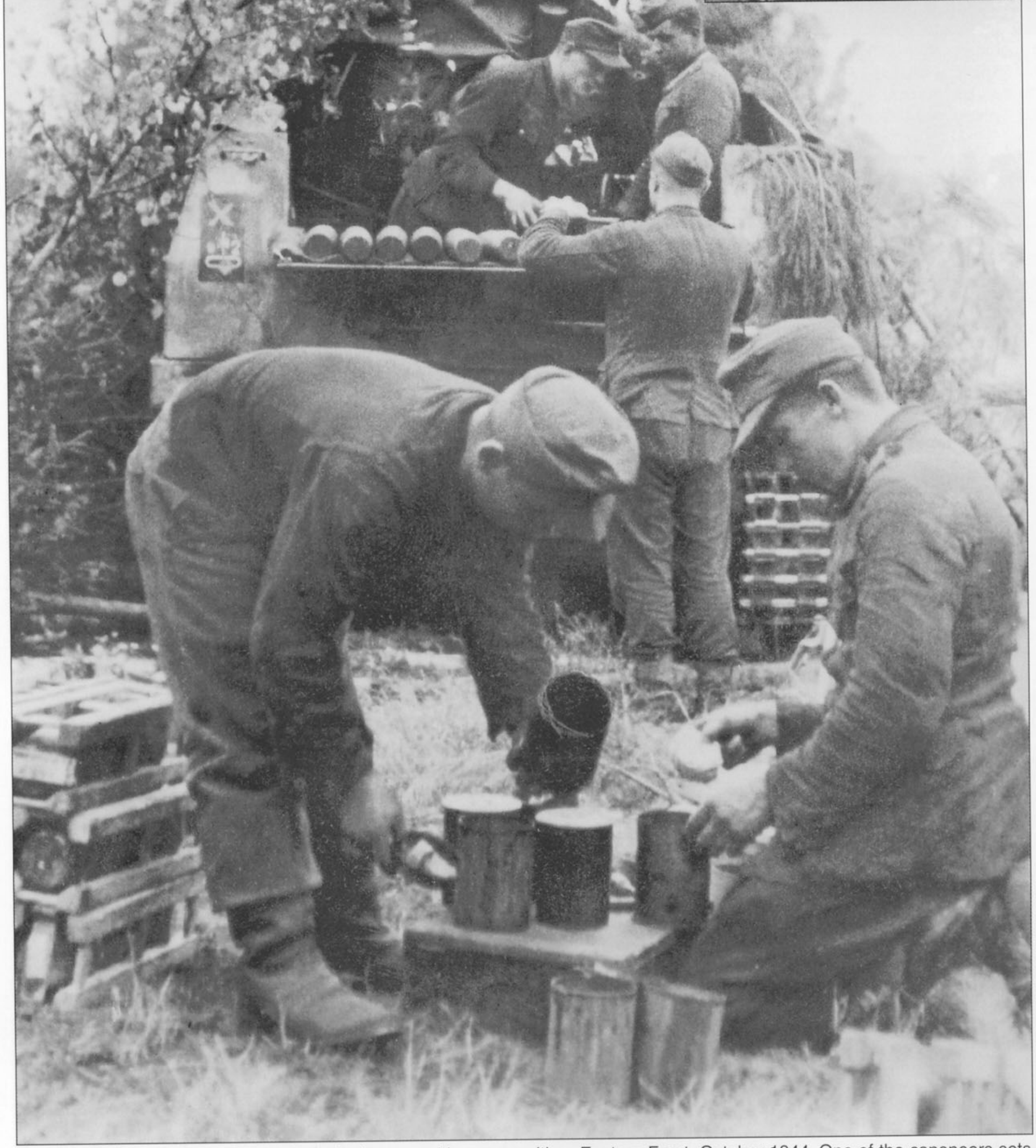
While camouflaging vegetation obscure these two 'Wespe', the lowered tailgate provides a view of the gun compartment with the howitzer in recoil. Note the red and white striped aiming stake poles stowed beneath the drop-tailgate. These are positioned forward of the gun to provide an azimuth reference point for indirect fire. An aiming stake can be seen between the two guns. Soviet Union, August 1944.



A scruffily uniformed American soldier stands beside an abandoned 'Wespe' in France, 1944. The spray-painted camouflage pattern appears to be olive green on dark yellow. A black "E" is seen on the forward superstructure. Normally letters, A-D, identified guns with four per battery. 'Wespe' batteries though had six weapons and the letters "E" and "F" designated these pieces. Prior to 1943, Panzer division artillery regiments were motorized, that is, the howitzers were towed by half-tracks. From early 1943 'Wespes' began to equip two six-gun batteries of the I.Abteilung* of Panzer-Artillerie-Regimenter of Panzer divisions. Its 3.Batterie had six 15cm "Hummel's".

II.Abteilung had two six-gun batteries of half-track-towed 10.5cm howitzers and III.Abteilung two batteries of 15cm howitzers and one with 10cm guns, all with four pieces.

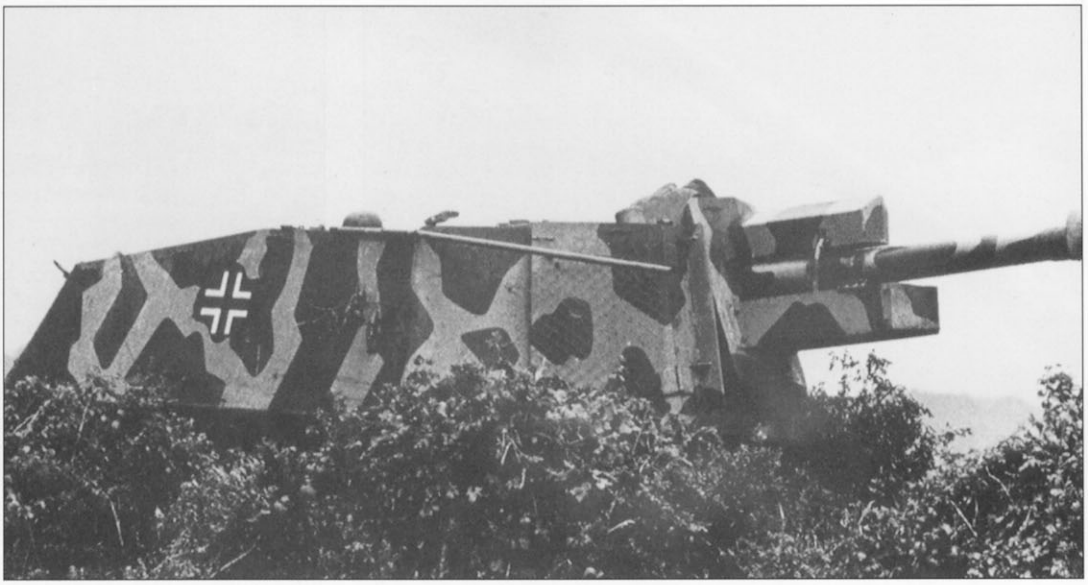
Panzergrenadier divisions made do with half-track-towed 10.5cm howitzers.

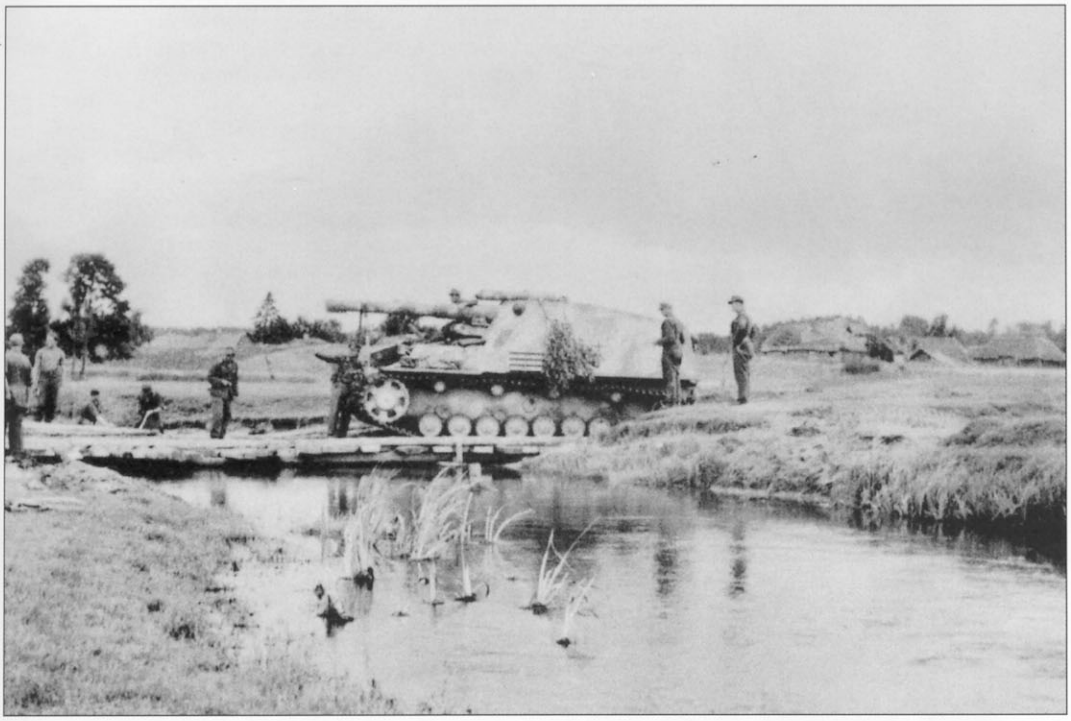


A 'Wespe' crew prepare for a fire mission unpacking ammunition, Eastern Front, October 1944. One of the canoneers sets 10.5cm projectiles on the tailgate to make them easily available for loading. Thirty-two rounds could be stowed inside the vehicle. In the foreground canoneers adjust the number of propellant increments in the cartridge cases that allowed for major range changes. The cartridges were issued in boxes and the projectiles in wood-frame crates as seen to the left. On the left rear of the 'Wespe' are the dark yellow insignia of 5.Panzer-Division and the white unit tactical symbol. These are on a dark gray rectangle, the vehicle's original base color over which a mottled camouflage pattern has been painted.

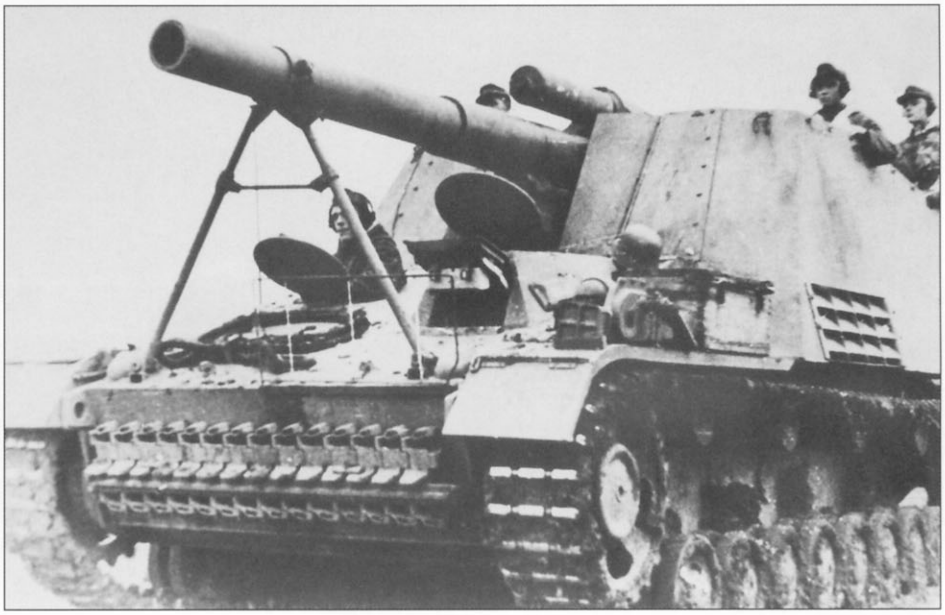
* Abteilung (a battalion with less than fice companies) was used within the armor, artillery, cavalry, reconnaissance, anti-tank, signal, and smoke troops.

This 10.5cm le.F.H.18(Sf.) auf Geschützwagen 39H(f) had been modified by the unit with steel fragmentation guards fitted to protect the 10.5cm howitzer's recoil cylinders as well as additional shielding on the barrel and over the side shielding. The camouflage pattern is dark green and dark yellow. All 24 vehicles that were built served with 21.Panzer-Division in Normandy.

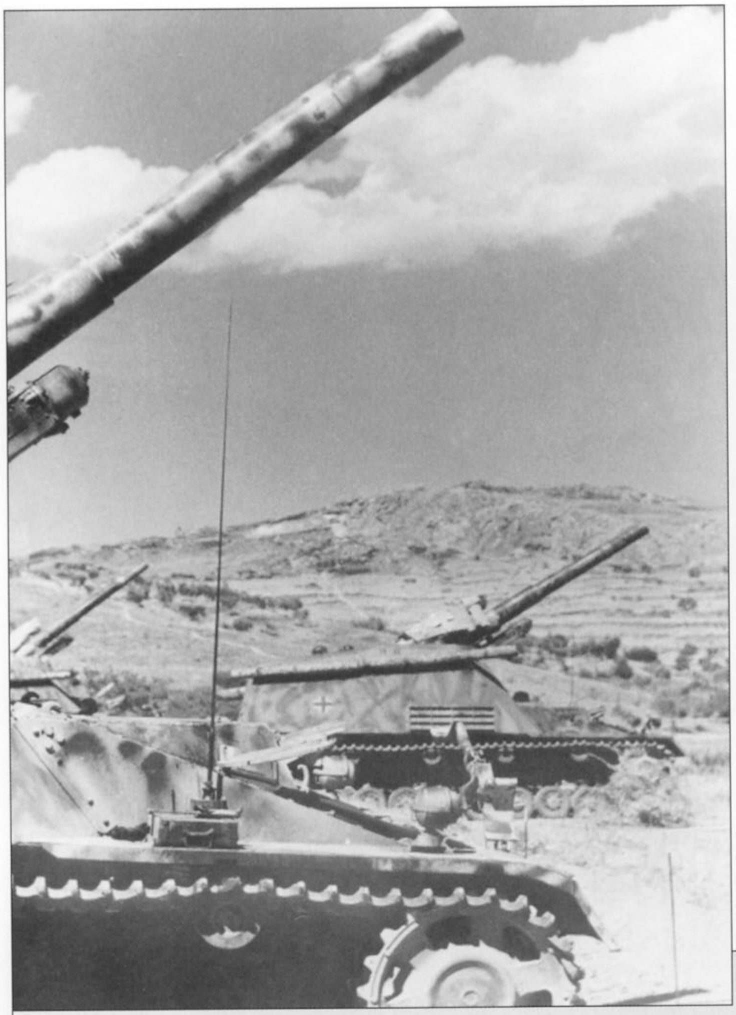


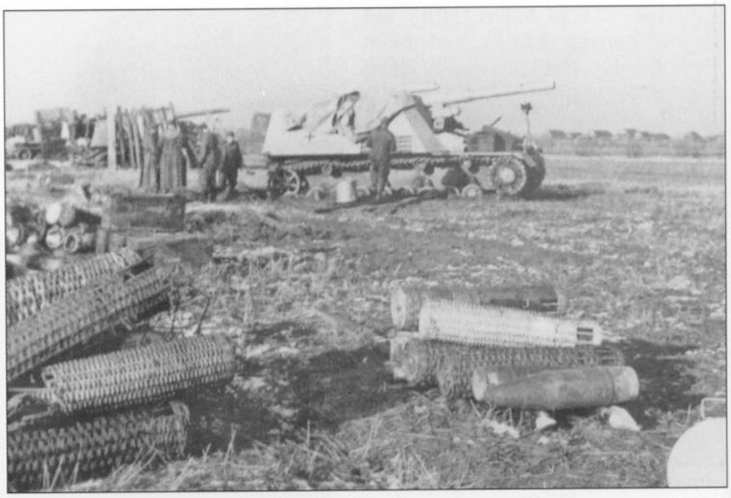


The 15cm Schwere Panzerhaubitze auf Geschützwagen III/IV (Sf.), or Sd.Kfz.165, was commonly known as the 'Hummel' (Bumblebee). This vehicle was built on a hybrid chassis employing features and components of the Pz.Kpfw.III Ausf.J (driving and steering mechanism) and Pz.Kpfw.IV Ausf.F (hull, suspension, engine, and cooling system). The engine was repositioned in the center to allow space for the gun compartment. This 'Hummel' crosses a simple, hastily erected bridge. The stream is not too wide, but while full-tracked vehicles are often thought of as able to cross minor obstacles, a stream such as this can easily halt such a vehicle. The below water stream banks may be too steep and even if shallow the saturated bottom too deep with mud and silt to allow the vehicle passage. It is evident that the pioneers are confident of their work as some remain on the timber pontoon bridge as the 25.2-ton (22,860-kilogram) vehicle eases over the rain-swollen stream.



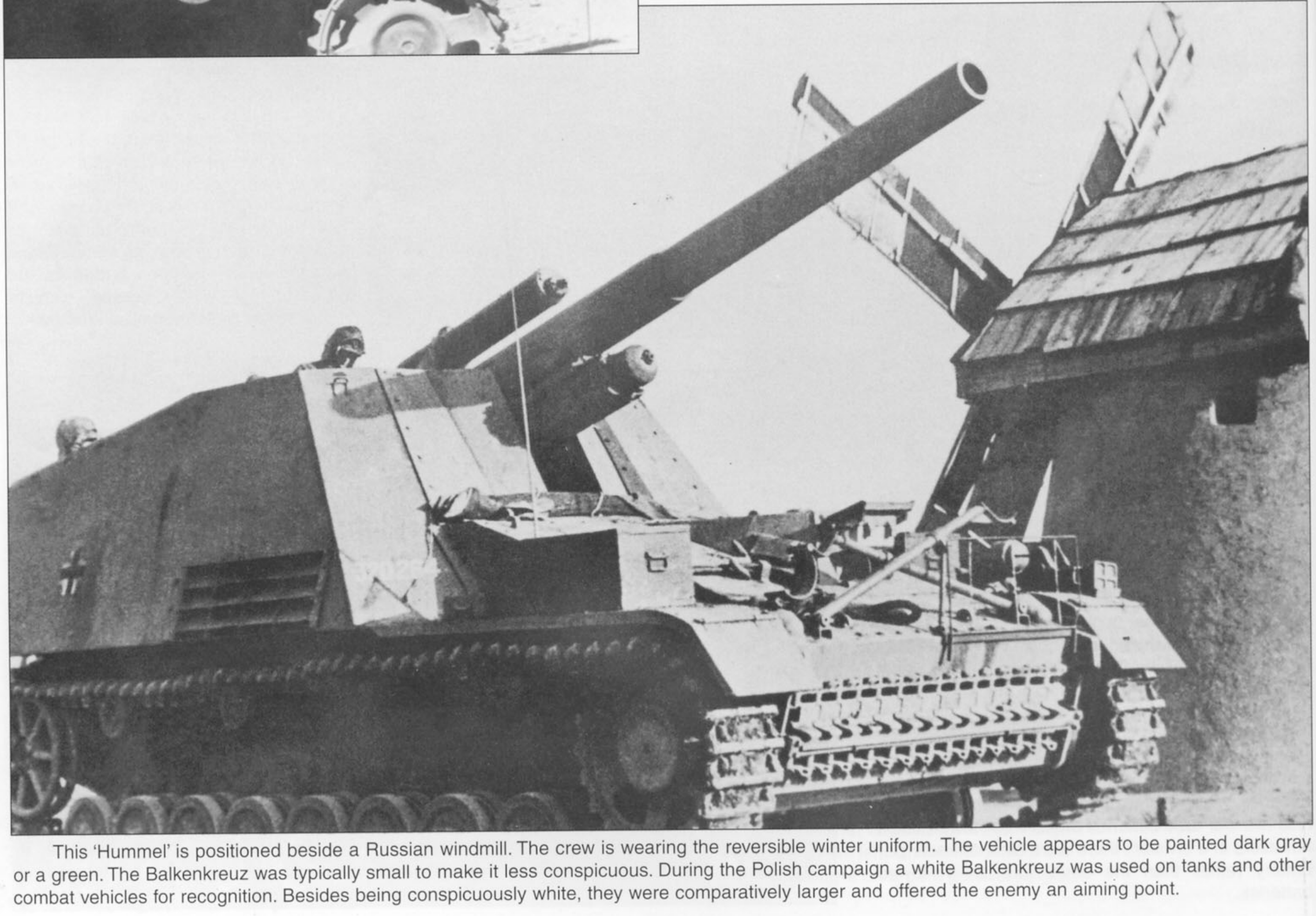
The crew of this 'Hummel' had fitted a wire frame guard on the upper glacis in front of the driver's port to aid the driver in positioning the vehicle in the direction of fire. The radio operator rode in the right bow compartment. The radio though could be operated from elsewhere in the vehicle. With only one battery of 15cm howitzer-armed 'Hummels' in a Panzer division, it was a valuable weapon for backing the two 10.5cm howitzer-armed 'Wespe' batteries. While they were few in number, there were also two four-tube batteries of half-track-towed 15cm howitzers in a division; there were six 'Hummels' per battery rather than the usual four as in towed batteries.



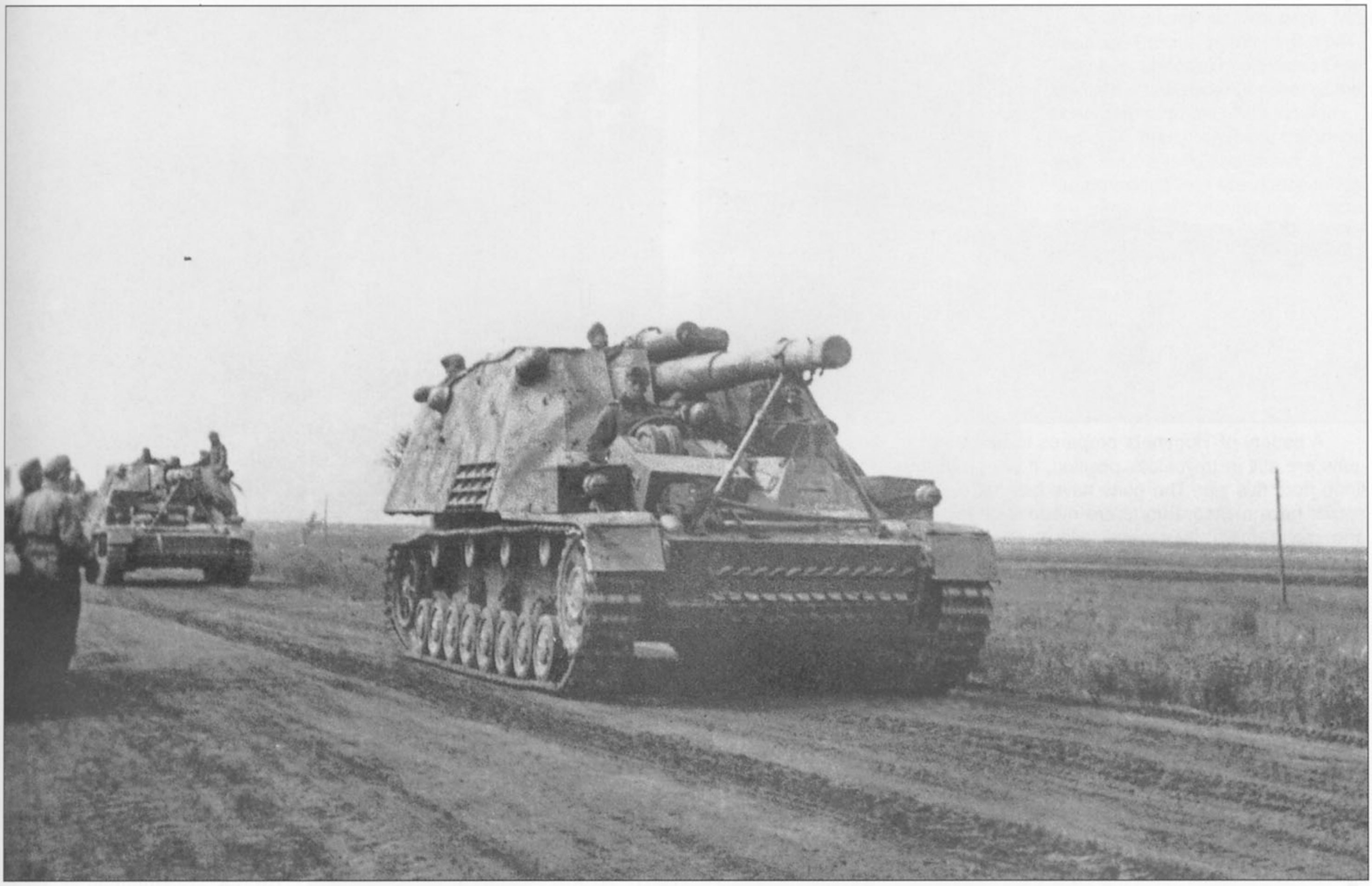


A 'Hummel' battery in firing position. The near vehicle has a tarp draped over the side to help break up its profile. The next gun further back has planks laid against its side for the same purpose. In the foreground are wicker shipping containers for the 94.6-pound (42.9-kilogram) high explosive projectiles. Artillerymen referred to the containers as a Koffer (suitcase). The disc-like object in the right foreground is the bottom side of a Tellermine. Artillery units would plant antitank mines on armor approaches into their area if they intended to occupy the position for sometime.

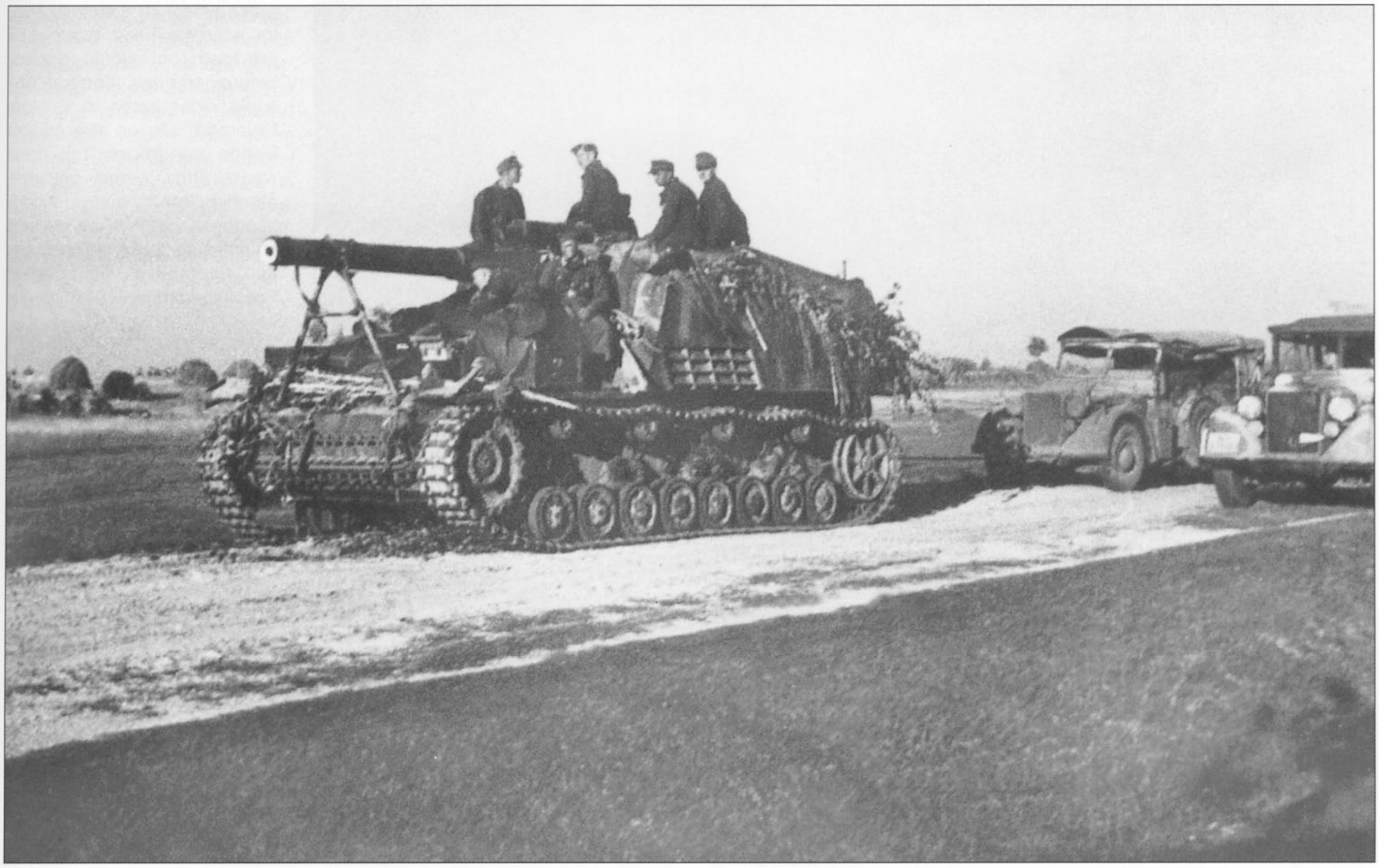
The guns of this 'Hummel' battery have been hastily spray-painted with irregular olive green jagged stripes over the dark yellow base. The logs fastened to the side, which were also camouflage painted, are to aid in unditching. Note the radio antenna mounting on the right front of the track guards. A 'Hummel' carried a Fu.Spr.Ger.f. radio, also used in the 'Wespe'.

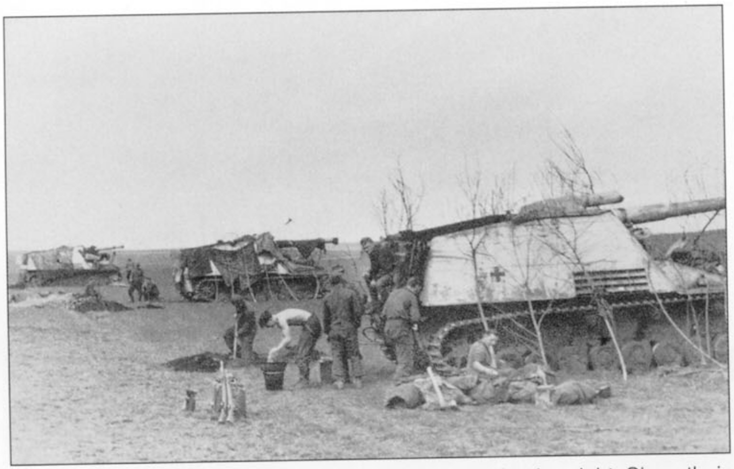


This 'Hummel' is positioned beside a Russian windmill. The crew is wearing the reversible winter uniform. The vehicle appears to be painted dark gray or a green. The Balkenkreuz was typically small to make it less conspicuous. During the Polish campaign a white Balkenkreuz was used on tanks and other combat vehicles for recognition. Besides being conspicuously white, they were comparatively larger and offered the enemy an aiming point.

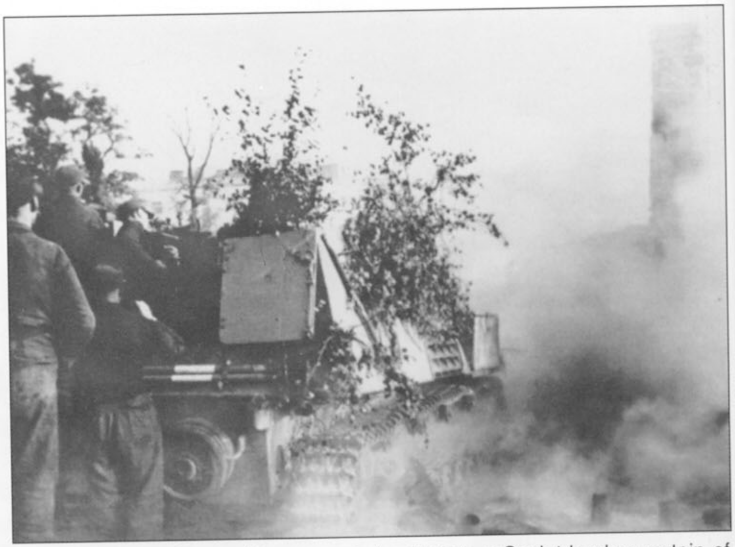


A battery of 'Hummels' move eastward deeper into the Soviet Union. For its day, even though it was considered a substitute weapon, it was an impressive and modern appearing self-propelled artillery piece. Plans were underway to develop both purpose-designed 10.5cm and 15cm self-propelled howitzers, but this effort was never completed.

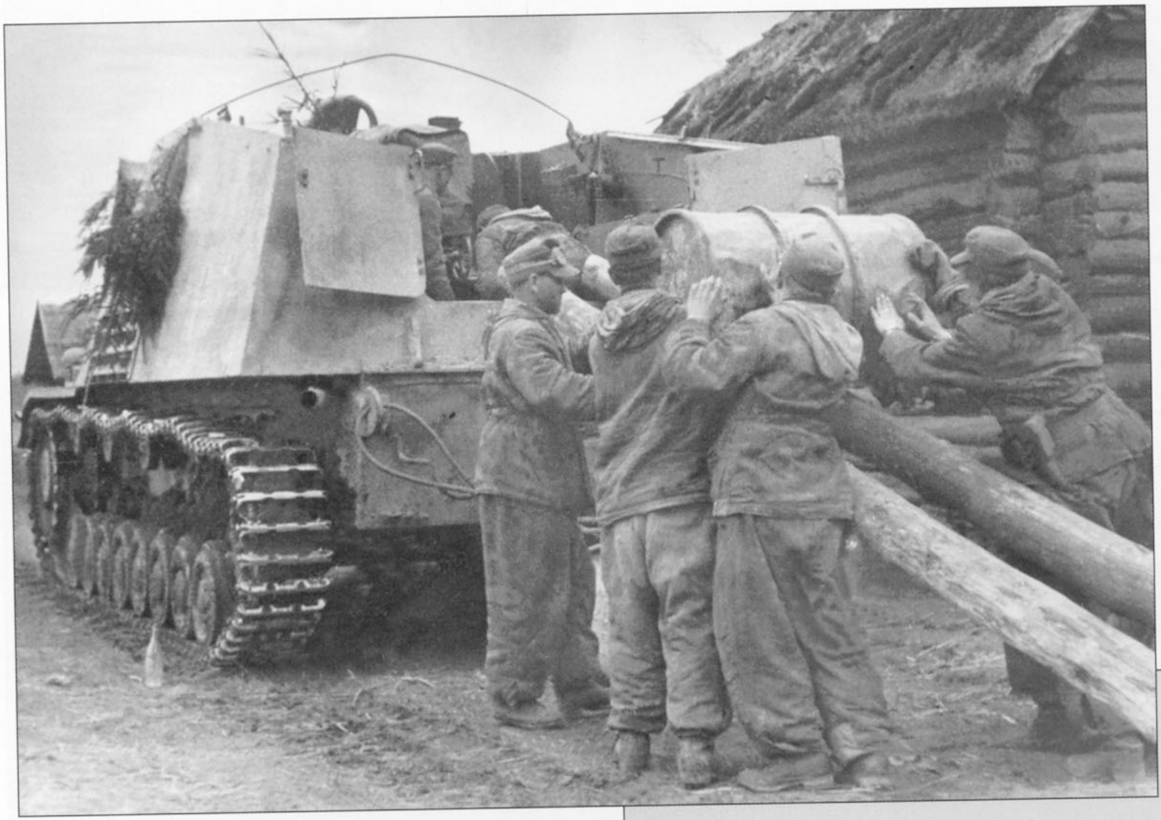




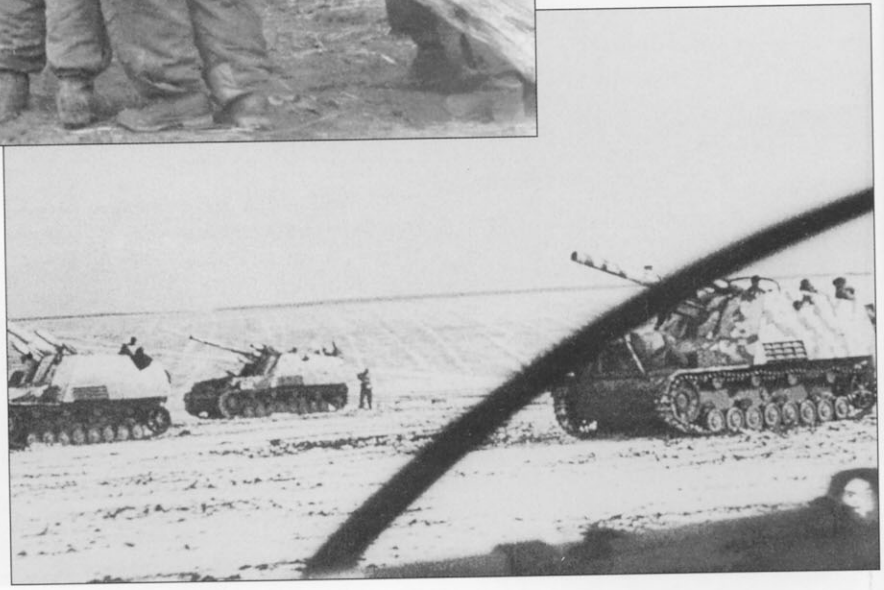
A battery of 'Hummels' prepares to bed down for the night. Since their guns are still in travel-lock position, it does not appear they expect to be firing from this site. The guns have been whitewashed, but it appears the snows have melted. Efforts are made to breakup the vehicles' silhouettes and make them less conspicuous on the brown landscape. This is accomplished by cut saplings (scarce on the Russian steppes), draped tarps, and camouflage nets. The crews have unloaded their bedrolls and personal gear and are digging slit trenches for the night.



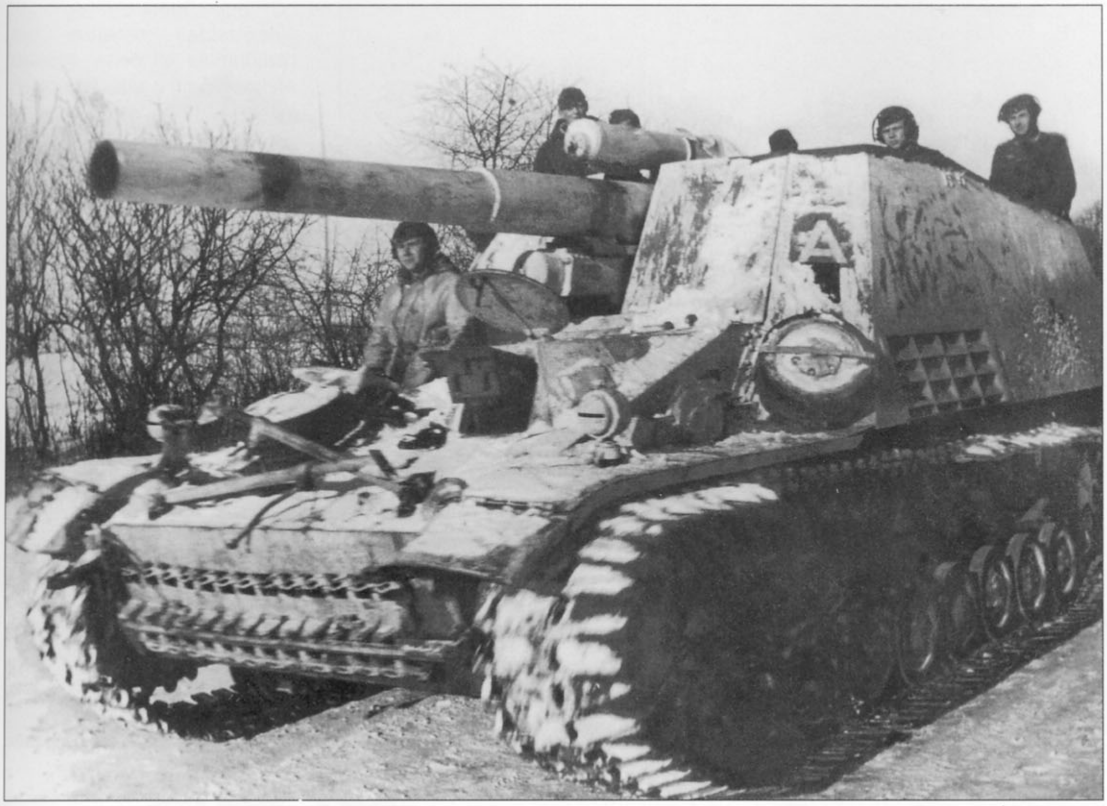
A 'Hummel' fires a 15cm round directly into a Soviet bunker certain of devastating effect. This was a last resort option. Being mounted on a full-tracked tank chassis with an armored well-sloped hull and superstructure coupled with a long barrel gun gives the 'Hummel' and 'Wespe' the appearance of an assault gun or tank destroyer. Their thin armor, high profile, and limited traverse made them extremely poor direct fire combat vehicles. They were intended for indirect fire support.



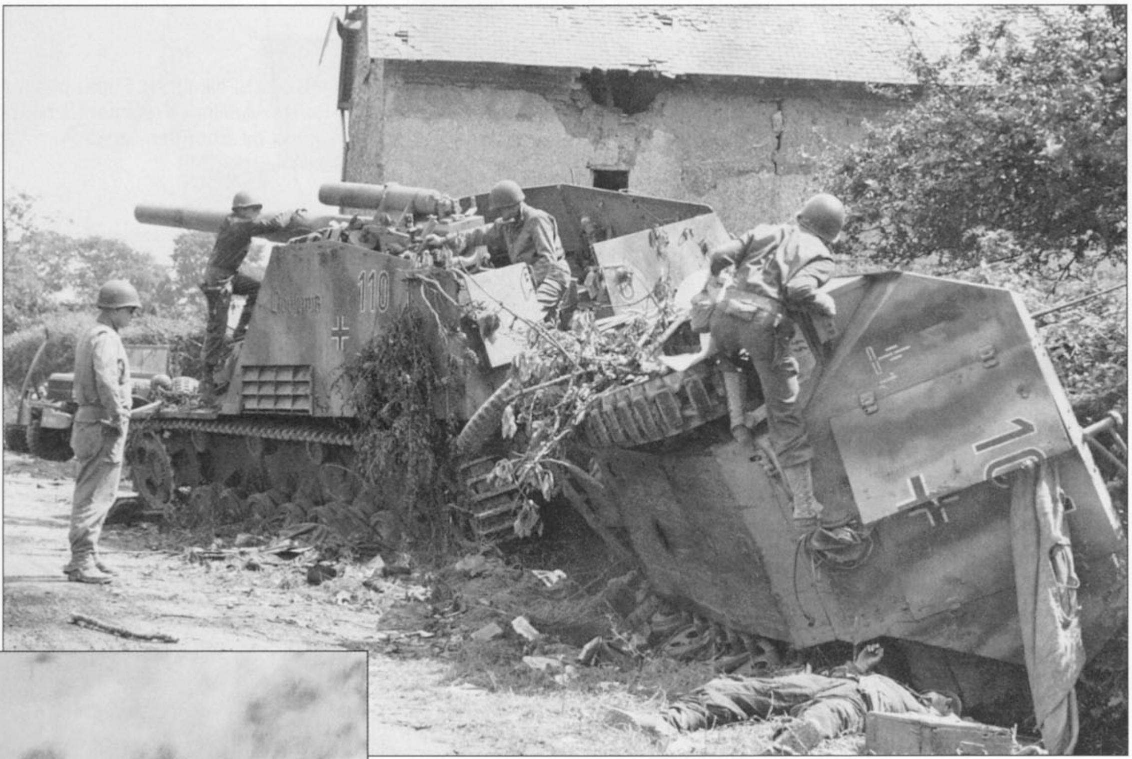
A 'Hummel' crew, preparing for a long move, rolls a 200-liter gasoline drum up a long ramp. They will carry this with them for en route refueling, for which a hand pump was provided, but would discard before entering combat. An apple cider bottle, a popular beverage, sits on the ground beside the tracks. The crew wears filthy winter uniforms after a long winter. Often bearing a camouflage pattern on one side, these uniforms are an alternative light gray; Russian spring of 1944.



A battery of 'Hummels' take up a firing position on the broad Russian steppe. It appears that they have just begun to establish the position. Normally some ammunition and equipment would be off-loaded behind the guns to provide the crew with more room to work. Aiming stakes have not been set-up yet as well. The 'Hummel' to the right is whitewashed with jagged bands left of its dark yellow base color. The others are painted solid white. Note that the lower portion of the hull and road wheels are left unpainted as the water-base whitewash would be quickly worn off by splashing slush and mud.



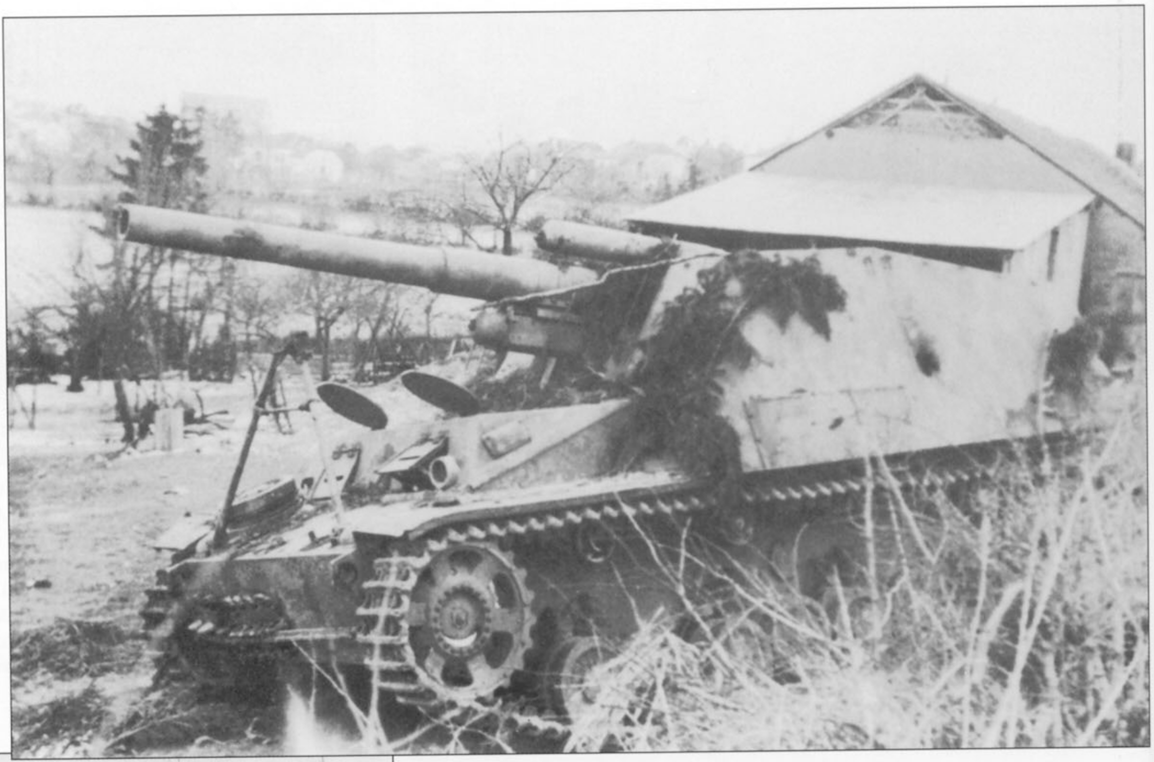
This 'Hummel', Haubitze "A," seen in Russia in January 1944, has been whitewashed. Besides the driver, the radio operator shared the bow compartment. The 'Hummel' had a six-man crew. Note the travel lock bars are folded down in the firing position and are not securing the barrel even though the vehicle is in motion. It has also been fitted with the wider 'Winterkette' tracks.

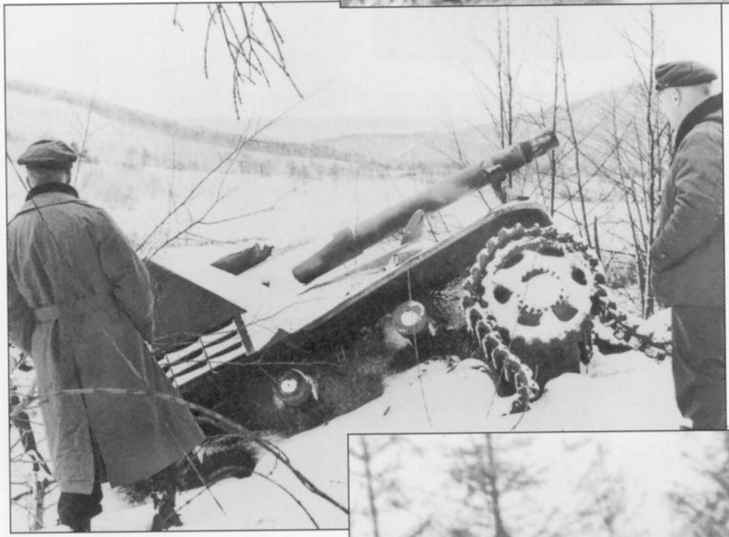


A 'Hummel' and a Sd.Kfz.251/1 half-track of SS-Panzer-Artillerie-Regiment 2 of 2.SS- Panzer-Division "Das Reich" are inspected by American intelligence personnel. They were destroyed by bombs and rockets delivered by fighter-bombers, Normandy, 1944. The half-track probably transported ammunition for the 15cm howitzer. The vehicle tactical numbers are black outlined in white. The division's wolf's hook symbol on the rear of the half-track is dark yellow and the symbol for a self-propelled artillery battery (1.Batterie) is in white beneath it.

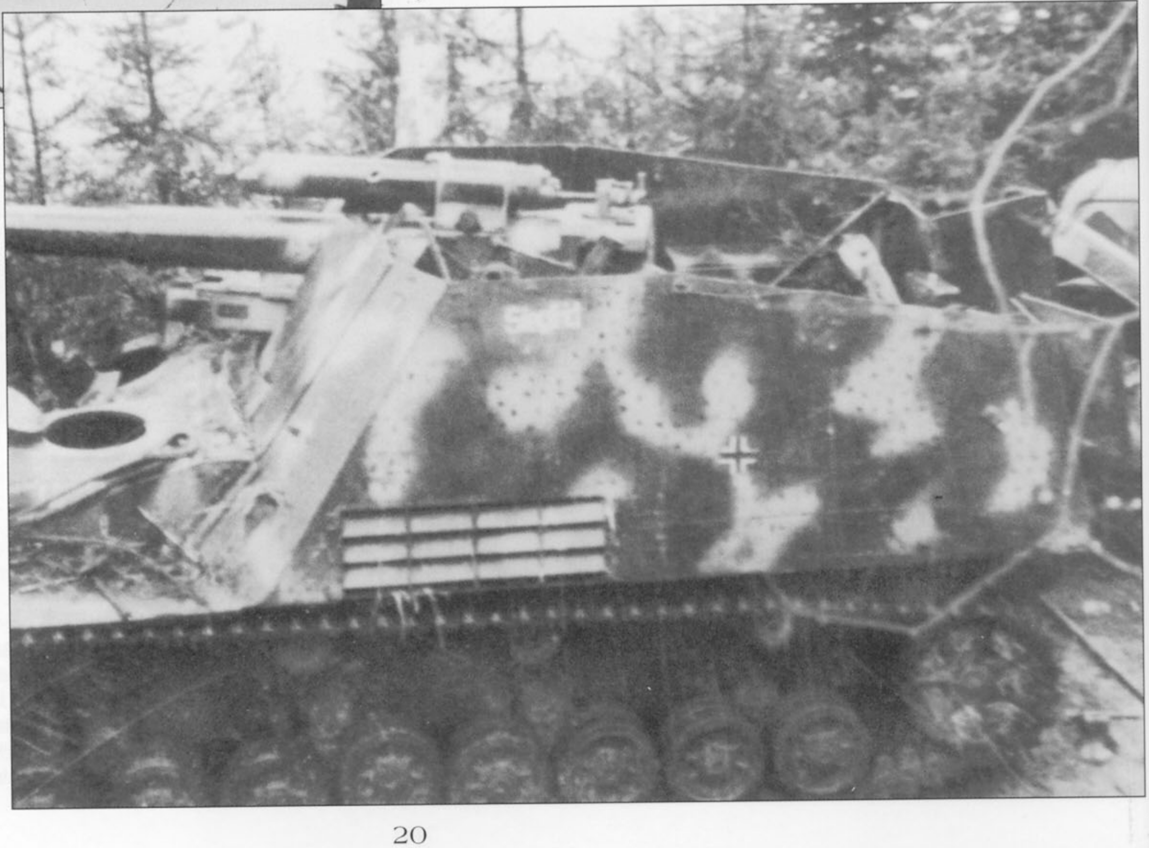
France, October 1944. 'Hummels' fire on American troops from camouflaged positions. The far gun is better camouflaged being positioned in a small grove of trees. The near gun is sitting in the open and the "piled on" vegetation gives an unnatural appearance. Only 18 rounds of ammunition could be carried aboard the 'Hummel'. For this reason a six-gun battery was supported by a Munitionstrager 'Hummel' hauling additional ammunition.

Over 700 'Hummels' were built, and even though there were only six assigned to a Panzer division, they were lost at a higher rate than they could be replaced. This late production 'Hummel', with the wider driver/radio operator's compartment, took a direct hit in the side rear, Brulange, France, October 1944. An MG-34 machine gun was carried inside the gun compartment.



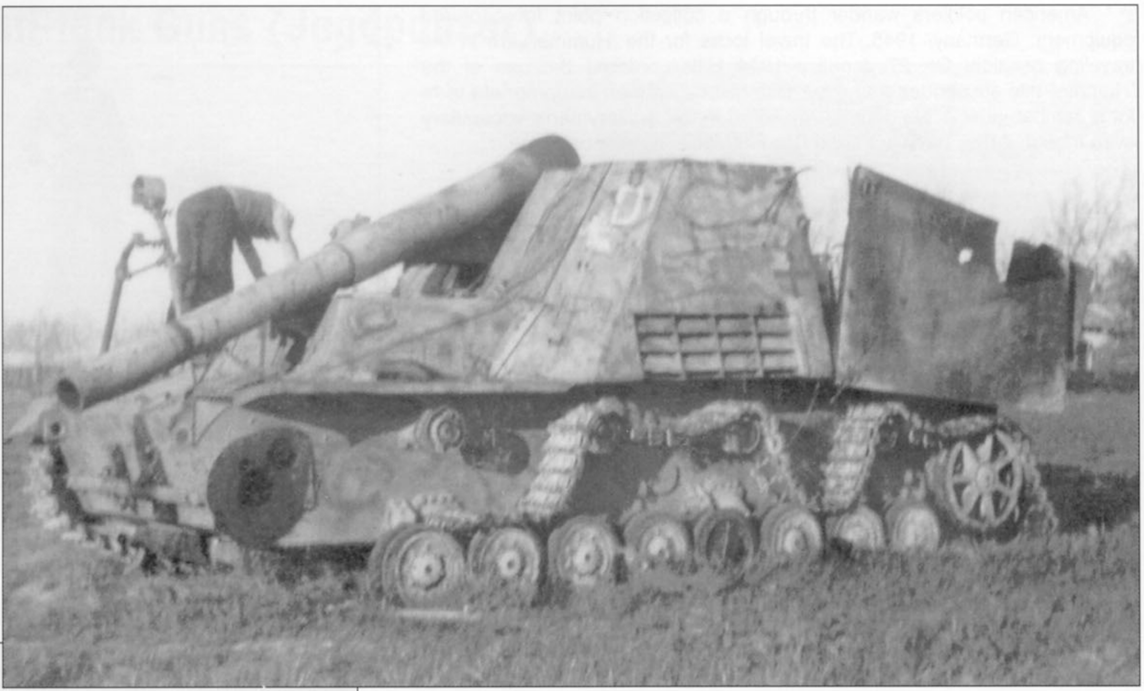


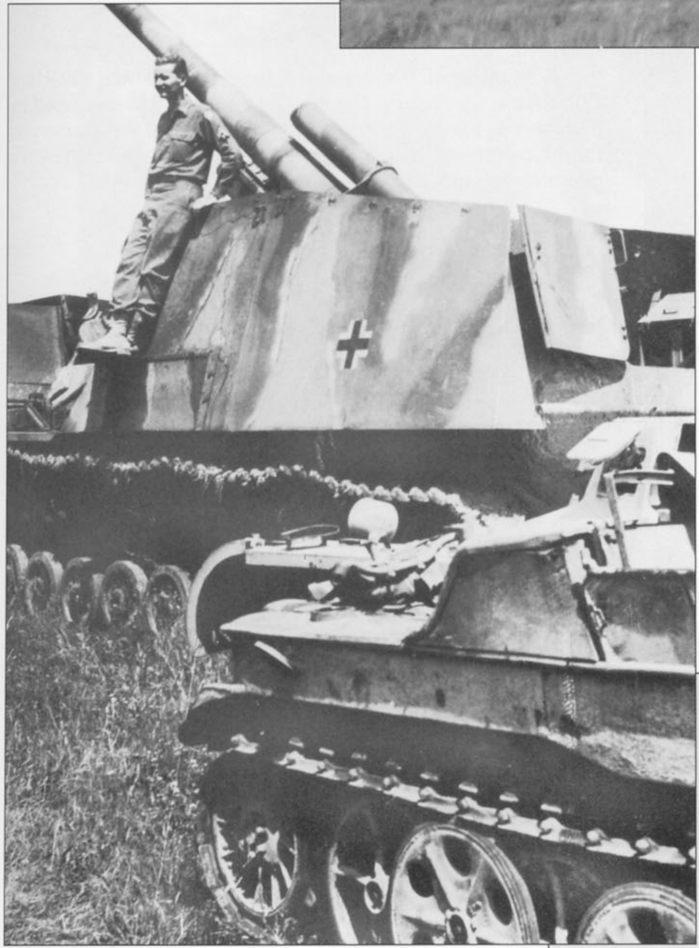
Two U.S. Ninth Air Force pilots inspect a knocked out 'Hummel' from SS-Panzer-Artillerie-Regiment 1 near Coo, Belgium in January 1945. It was destroyed by Sherman tanks from Task Force Lovelady on 20 December, 1944.



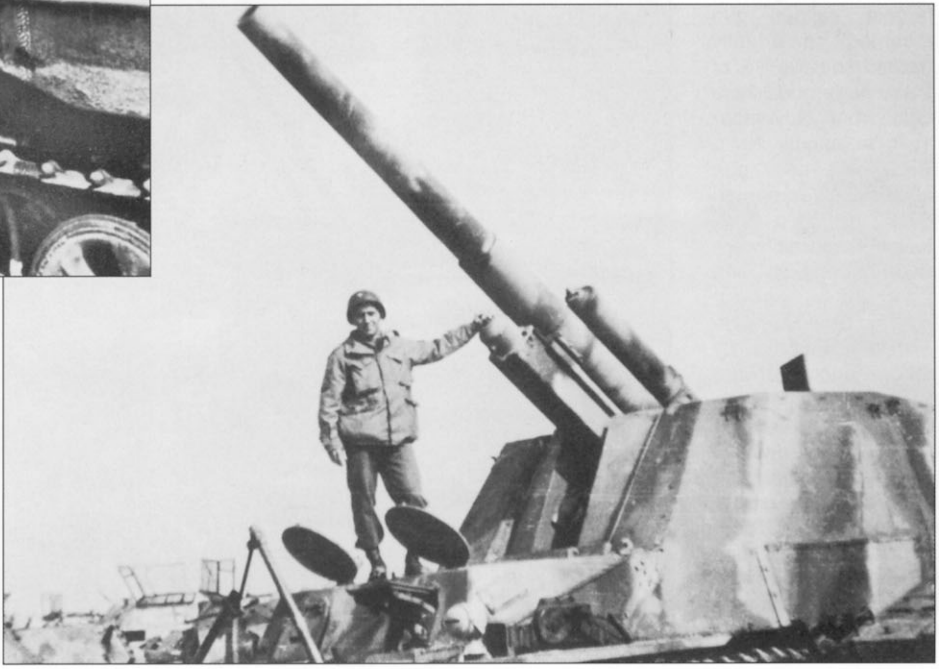
An abandoned 'Hummel' in Austria, 1945. This gun is spray-painted in irregular splotches of olive green and red brown on dark yellow. Dabs of the two darker colors are scattered over the pattern for a more natural effect. The vehicle's name, "Siegfrit," is painted in white on the superstructure's side. A shell fragment hole can be seen in the over-barrel recoil cylinder.

This 'Hummel', gun "D," has suffered catastrophic damage when its ammunition detonated after a hit. The white insignia below the white "D" appears to be the sword-bearing ghost emblem of 11.Panzer-Division, the Gespenster-Division ("Ghost Division").



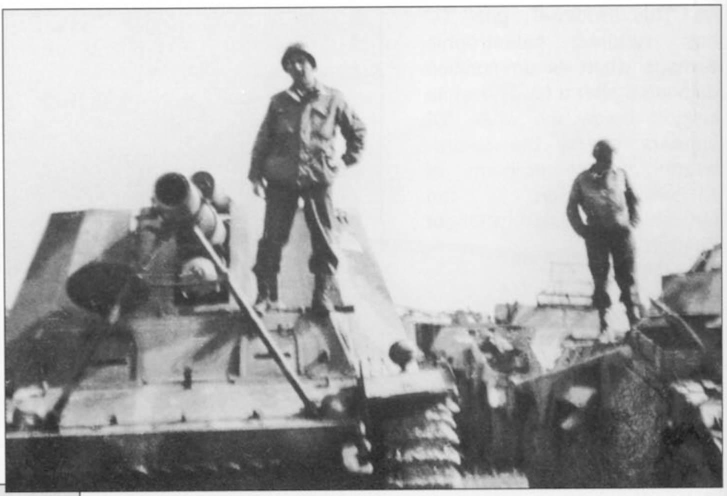


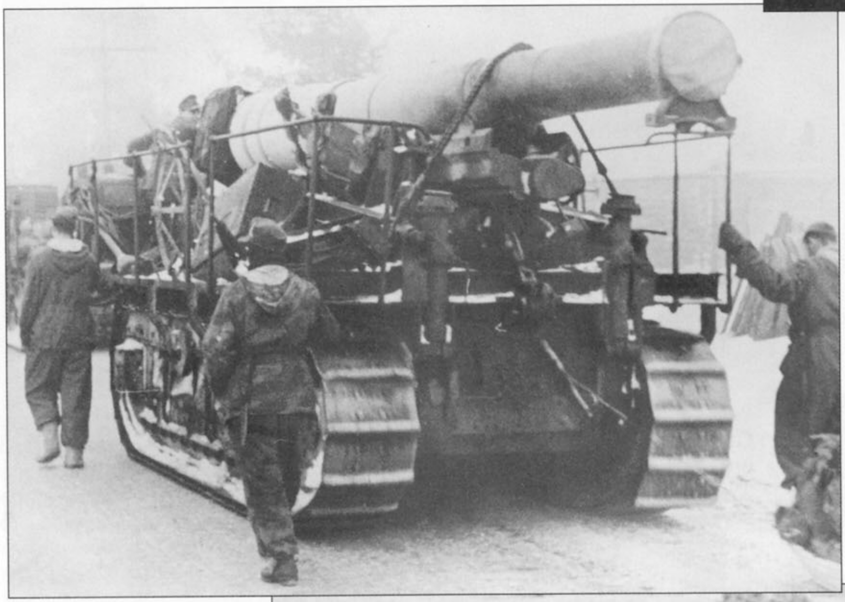
An American technician 5th grade stands on a captured 'Hummel' at Pilsen, Czechoslovakia, May 1945. The camouflage pattern is olive green and red brown on the dark yellow base. As opposed to the drop-tailgate on the rear of a 'Wespe', the 'Hummel' had a pair of small double doors, one of which can be seen in the open position here. Like the 'Wespe', three aiming stake poles were carried in brackets beneath the rear doors. In the foreground is the rear portion of a Sd.Kfz.2 light half-tracked motorcycle, or kleines Kettenkrad. These were prized as war booty by the Allies and continued to be manufactured after the war for use by the post-war German Forest Service.



The 15cm s.F.K.18/1 L/30 heavy field howitzer of the 'Hummel' was the same weapon as used on the towed version. Ammunition included: high explosive, armor-piercing, concrete-piercing, and smoke. Elevation was 42 degrees and traverse was 15 degrees right and left. A louvered cover ventilated the engine, but many were additionally fitted with an angled shield opening upward. This can be seen in the lower right of the photograph. Czechoslovakia, May 1945.

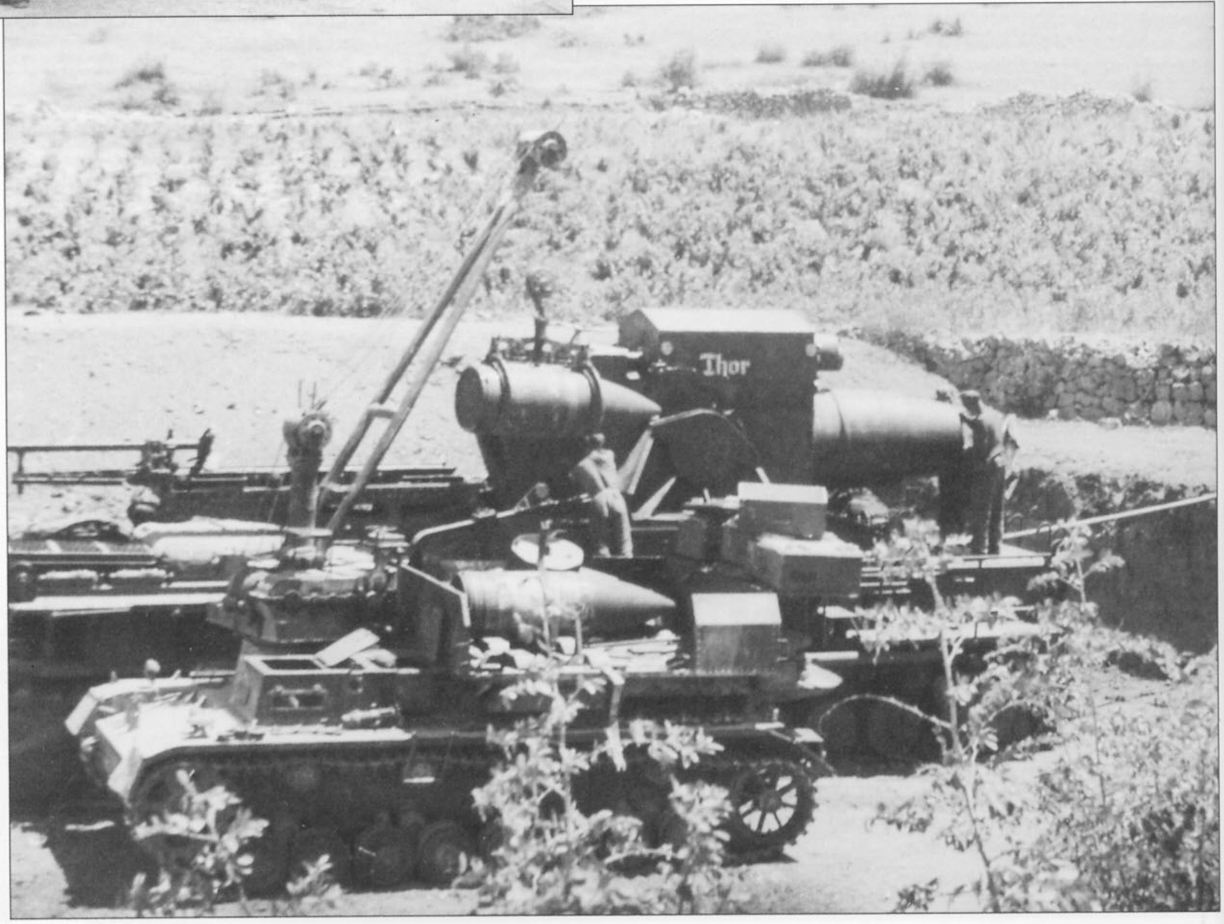
American soldiers wander through a collection point for captured equipment, Germany, 1945. The travel locks for the 'Hummel' are in the traveling position. On 27 January 1944 Hitler ordered the use of the 'Hummel' title suspended as he felt 'Bumblebee' was an inappropriate term for a combat vehicle. No doubt it remained in the artilleryman's vocabulary even though it may have not been used in official correspondence.



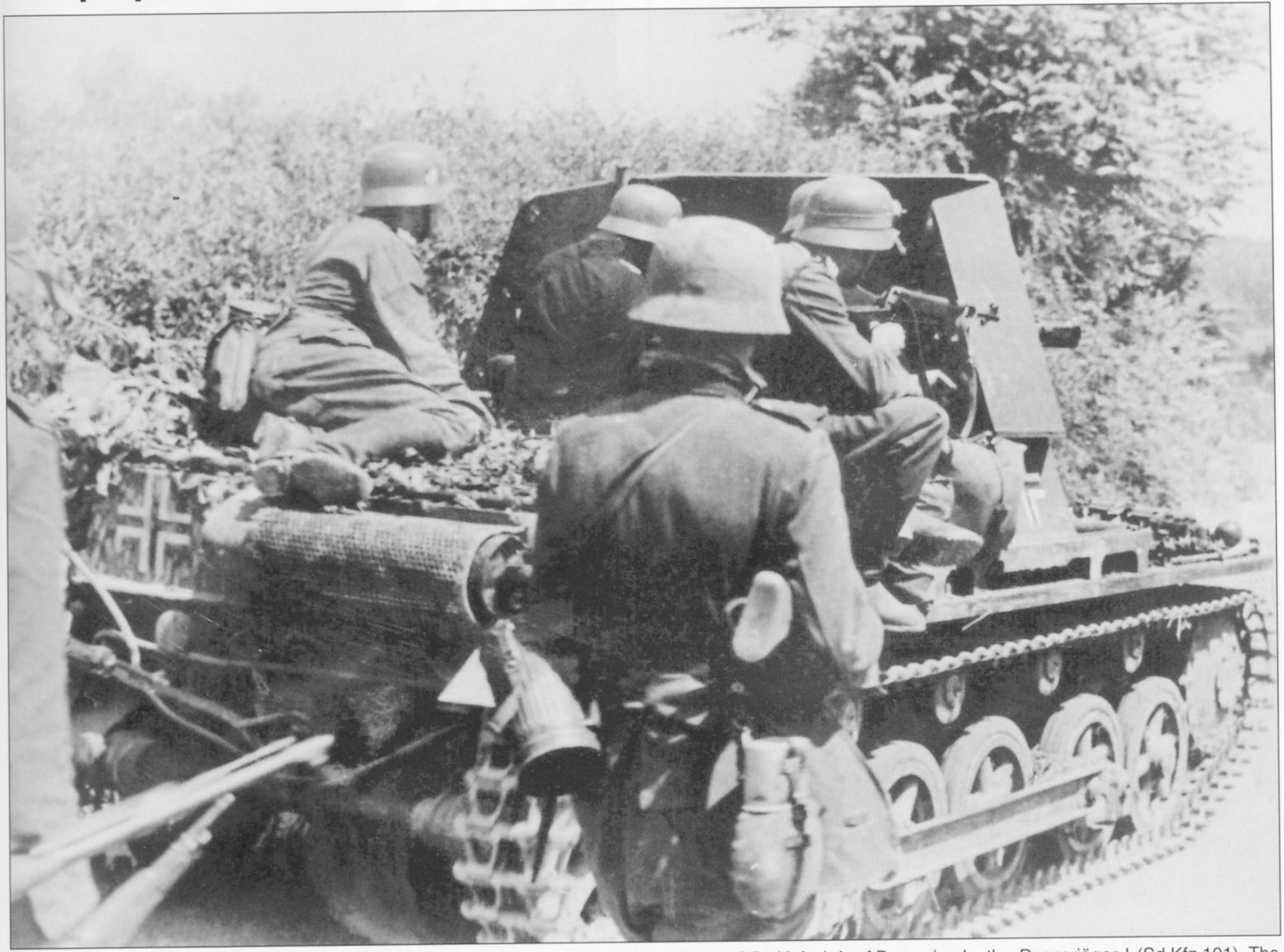


A number of the French 'Canon de 194 mle GPF sur Chenilles' were captured by the Germans in 1940 and used by them as the 19.4cm Kanone 485(f) GPF, this one in operation on the Eastern Front. It consisted of a World War I French 194mm gun on a self-propelled mounting.

The Karl-Gerät 040 was fitted with an enormous 60cm howitzer making it the largest caliber gun mounted on a fully tracked chassis. Six of these huge guns were built from November 1940 to August 1941. Here we see gun number IV, named 'Thor', having a 2.17-tonne 60cm schwere Betongranate 40 (concrete piercing) shell being swung over onto its loading tray by an accompanying Munitionsschlepper based on the chassis of a Pz.Kpfw.IV Ausf.E. 'Thor' was later fitted with a longer but smaller diameter 54cm barrel as were two other guns. In this configuration, it was known as Karl-Gerät 041.

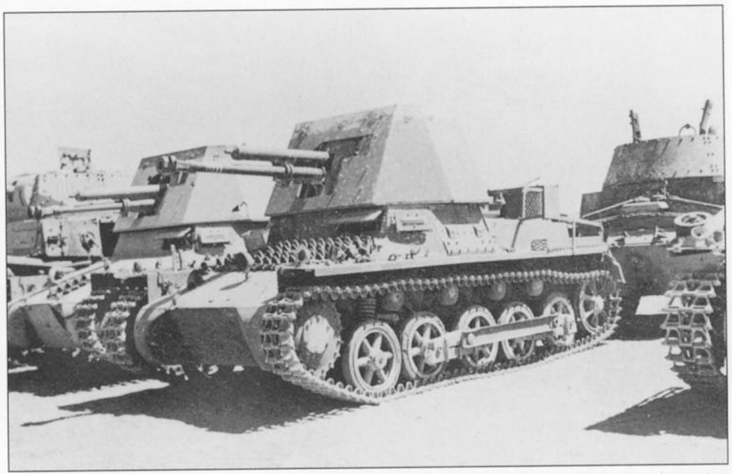


# Self-propelled Anti-tank Guns (Jagdpanzer)

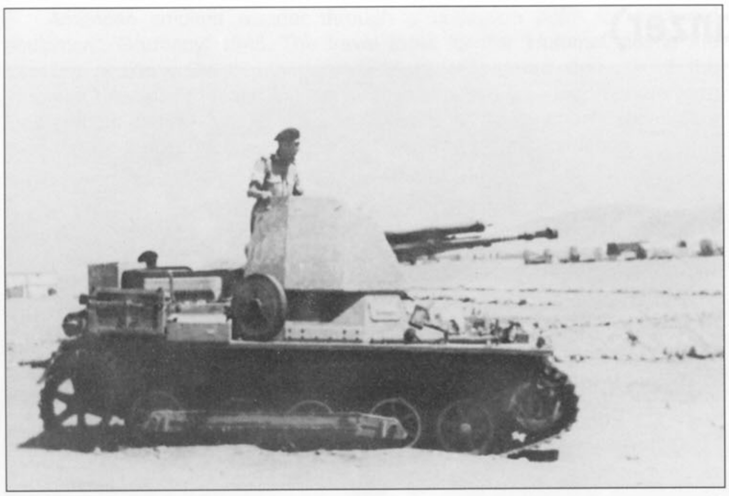


The earliest attempt at a self-propelled antitank gun was the 4.7cm PaK(t) (Sf.) auf Pz.Kpfw.I Ausf.B, or simply, the Panzerjäger I (Sd.Kfz.101). The original concept was for it to mount the 5cm PaK 38, but it was not yet available and a self-propelled antitank gun was essential. Czechoslovak Skoda 47mm KPUV vz.38 Model A5 guns were installed. Designated by the Germans as the 4.7cm PaK 36(t) L/43.4, it proved to be inadequate owing to its comparatively low velocity. Here infantrymen use a Panzerjäger I as cover as they advance down a French road, 1940. This one possesses the Alkett five-sided superstructure. The MP-38 machine pistol-armed group (squad) leader sits on the right track guard and the platoon leader is on the left. One the Panzerjäger crewmen can be seen between the two hitchhikers in his black panzer uniform.

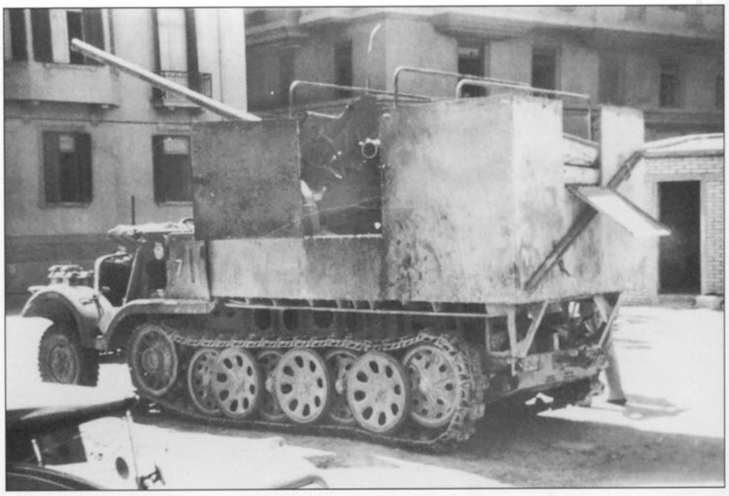
A Panzerjäger I passes through a Russian city. Owing to its many flaws most were withdrawn from service in 1943.



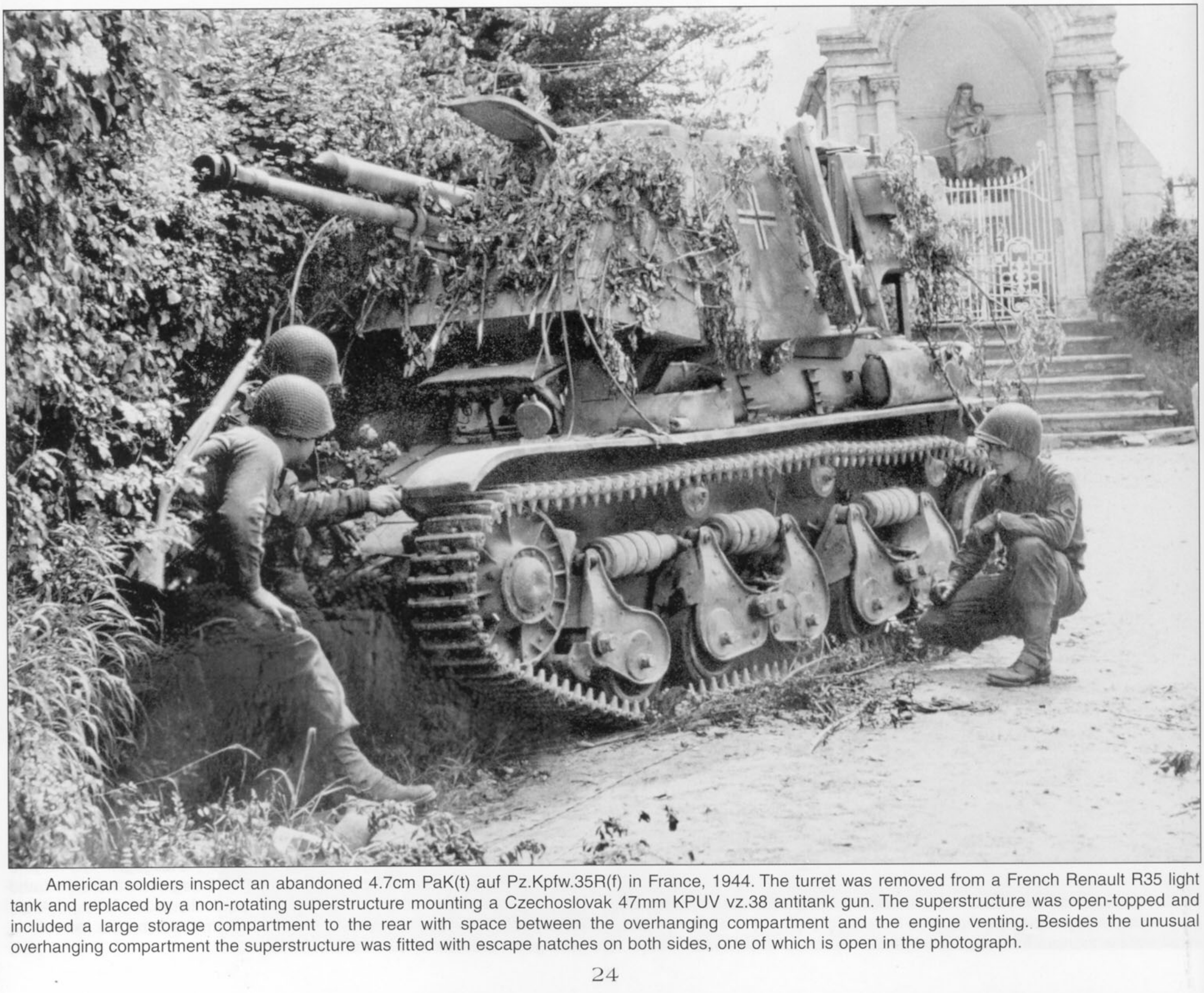
The Panzerjäger I chassis was provided by the obsolete, but plentiful Pz.Kpfw.I Ausf.B. In 1940 and 1941 202 were produced and saw use in France, North Africa, and Russia with separate Panzerjäger-Abteilungen. The Panzerjäger I's flaws included a limited 17.5 degrees traverse left and right and poor cross-country mobility. This particular example is an Alkett variant with a five-sided superstructure. The frame rack on the rear of the track guard held six boxes of ammunition.



A British soldier in North Africa examines an abandoned Panzerjäger I. This one is a late production vehicle identifiable by its seven-sided superstructure. Ten late versions were built by Alkett and the remaining sixty were built by Kloeckner-Humboldt-Deutz. The gun compartment was cramped for the three-man crew and was open to the top and rear. It carried 86 rounds of ammunition. Because of the confined gun compartment and the vehicle's small size, crew typically strapped on numerous boxes and creates for tools, spare parts, and equipment. Many vehicles arriving in North Africa still bore their continental dark gray finish. Crews sprayed oil on their vehicles and flung on sand. Once baked beneath the desert sun it adhered rather well.

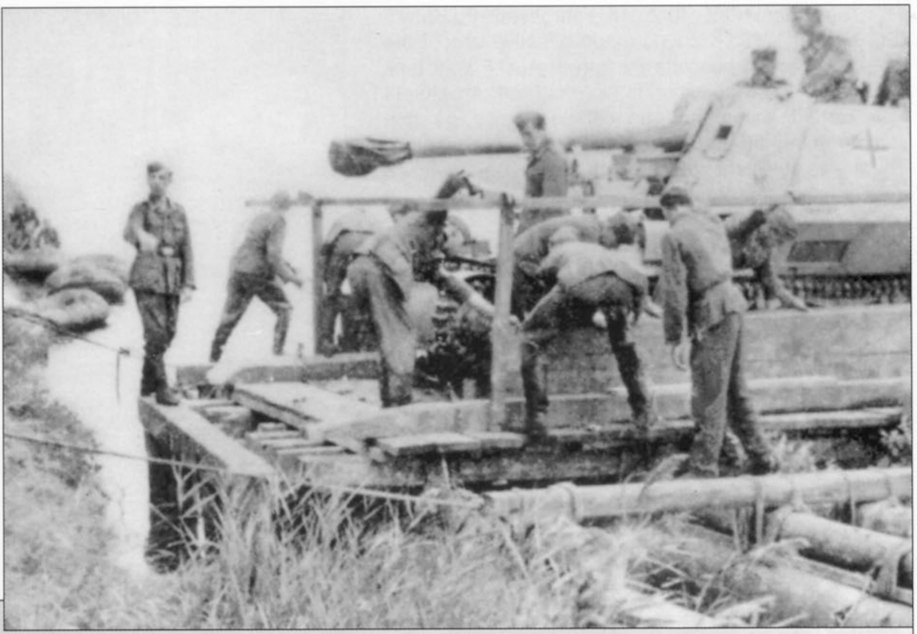


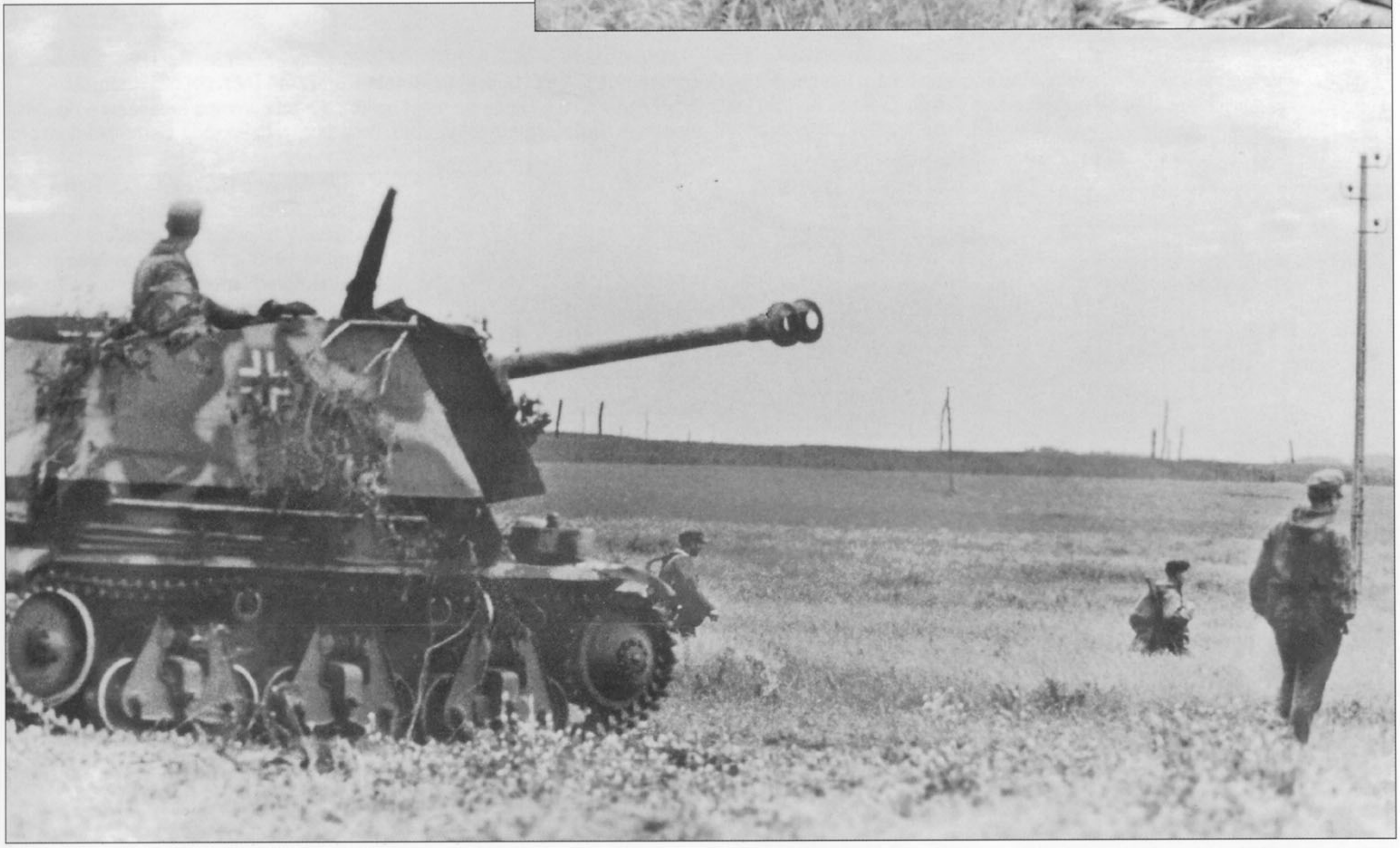
In an effort to provide much needed mobile antitank guns nine Soviet 76.2mm field guns were mounted on 5-ton Sd.Kfz.6 halftracks in 1941. The 7.62cm PaK 36(r) auf Panzerjäger Selbstfahrlafette 'Diana' had a crew of five. The 10mm armored housing protected the crew from light fragmentation and little else. A crew access door is in either side of the high profile housing. The rear drop-hatch allowed empty cartridge cases to be ejected. The front was mostly open, but the gun's original shield was retained. It had a 30-degree traverse left and right. 64 rounds could be carried. Six were built and all served with Pz.Jg.Abt.605 in North Africa.



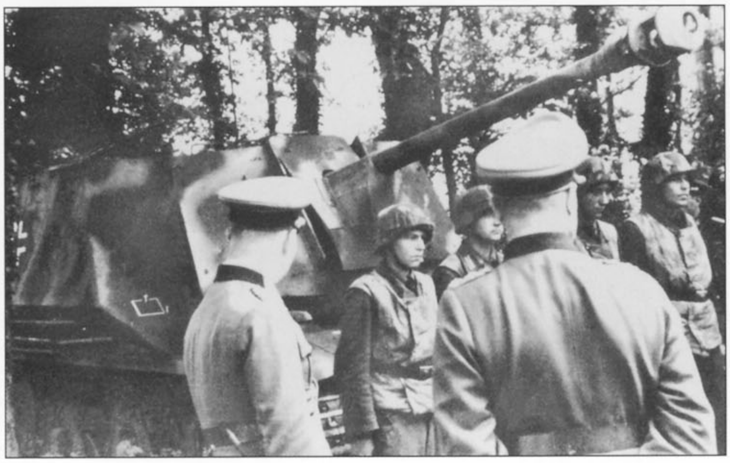
American soldiers inspect an abandoned 4.7cm PaK(t) auf Pz.Kpfw.35R(f) in France, 1944. The turret was removed from a French Renault R35 light tank and replaced by a non-rotating superstructure mounting a Czechoslovak 47mm KPUV vz.38 antitank gun. The superstructure was open-topped and included a large storage compartment to the rear with space between the overhanging compartment and the engine venting. Besides the unusual overhanging compartment the superstructure was fitted with escape hatches on both sides, one of which is open in the photograph.

A 7.5cm PaK 40/1(Sf.) auf Geschützwagen (GW) Lorraine Schlepper (f) Marder I (Sd.Kfz.135). Built on a French Tracteur Blindé 37L, 170 were converted in July and August 1942. It was armed with the 7.5cm PaK 40/1 L/46 gun plus an internally carried MG-34, which could be mounted top the superstructure or employed dismounted. Armor thickness varied from 5-12mm. This Marder I (Sd.Kfz.135) aboard a ferry is nudged to shore. The ferry crew rush to position the debarkation ramps. The Germans made wide use of ferries constructed from pre-fabricated timber bridge sections and inflatable rubber boat pontoons



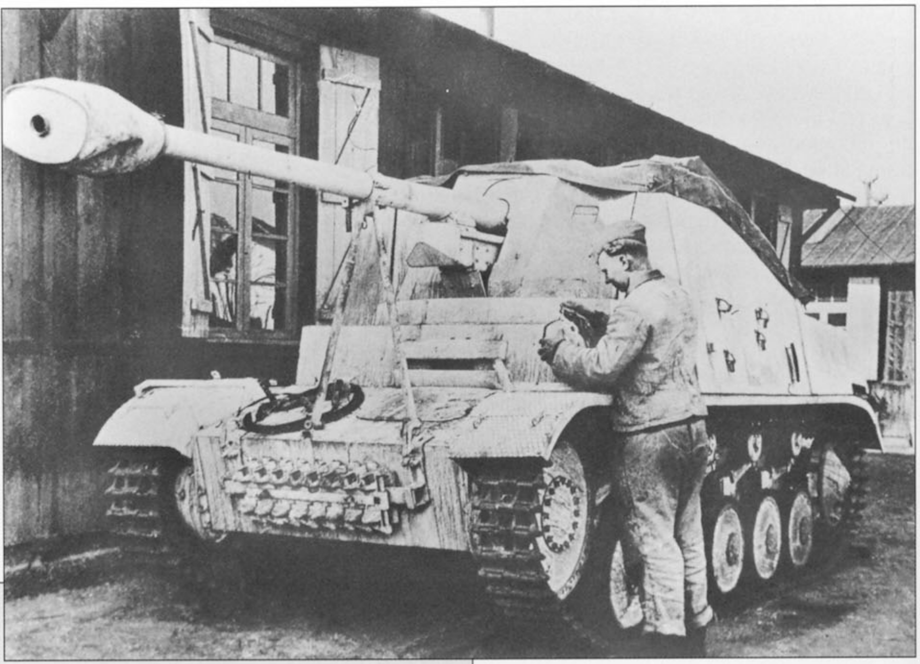


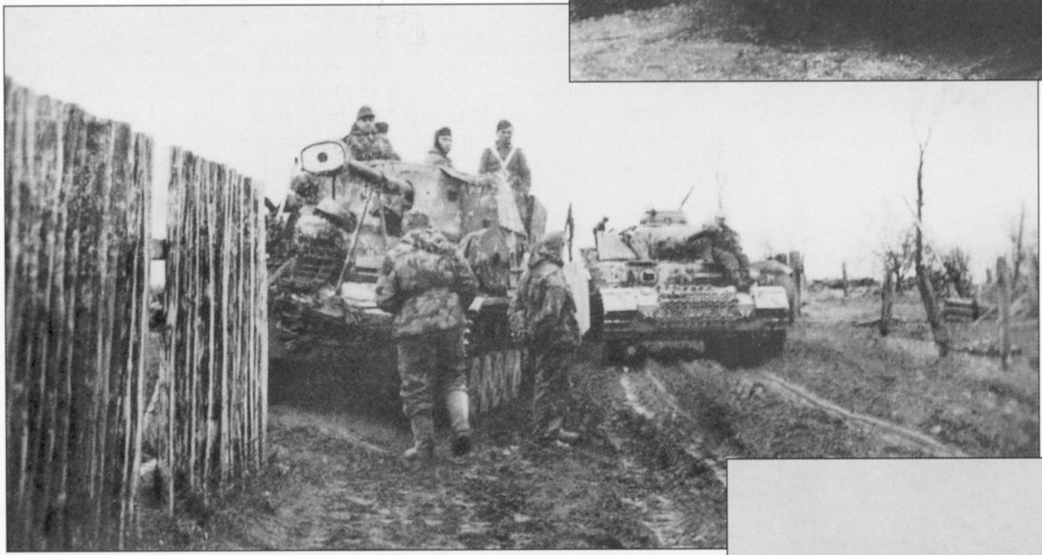
Troops cautiously cross a broad field near Caen, France, June 1944 supported by a 7.5cm PaK 40(Sf.) auf Geschützwagen 39H(f). Built on a Hotchkiss H-39 tank chassis, it can be differentiated from the version built on a Lorraine tractor chassis by the three angled road wheel supports. The Lorraine's has a single vertical support between each pair of road wheels. The camouflage is dark green splotches and narrow dark brown bands on dark yellow.



The camouflage of this PaK 40(Sf.) auf Geschützwagen 39H(f) appears to be dark green over a dark yellow base. On 23 May 1943 the tactical map symbols for most types of units were changed. The white rhomboid symbol with an arrow identified this unit as 1st Battery of an assault gun battalion (Sturmgeschütz-Abteilung) in France. The four-man crew wears locally fabricated sleeveless camouflage smocks.

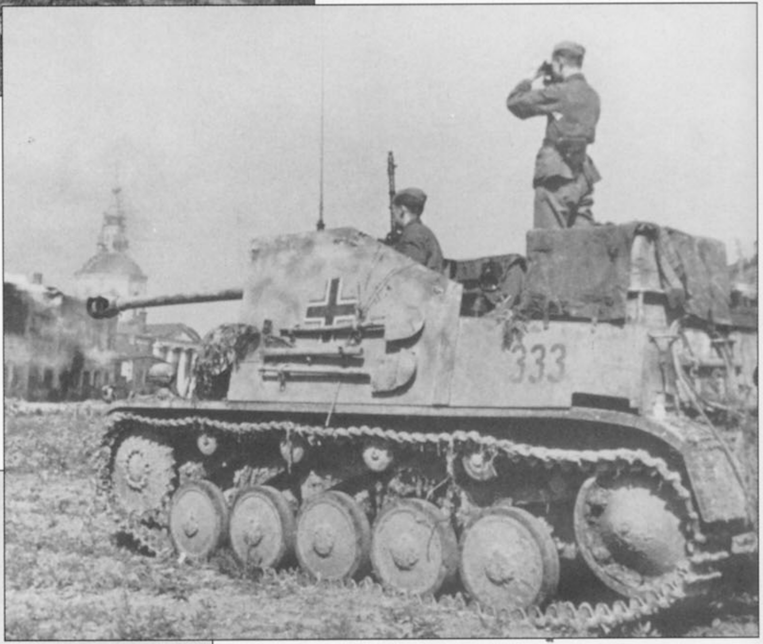
The 7.5cm PaK 40/2 auf Fahrgestell Pz.Kpfw.II (Sf.) Marder II (Sd.Kfz.131) made effective use of the large numbers of obsolete Pz.Kpfw.II Ausf.F light tank chassis. 37 main gun rounds were carried. An MG-34 was carried inside the gun compartment. The gun compartment had an open top and a partly open back. There was sufficient cover provided by the high engine deck to allow the crew to duck down inside. A canvas cover provided the gun compartment with weather protection. This was removed in combat. 5-30mm armor protected the three-man crew. The brackets on the superstructure's side held picks and shovels. The crewman cleaning the headlight is wearing the off-white drill uniform worn when conducting vehicle maintenance.

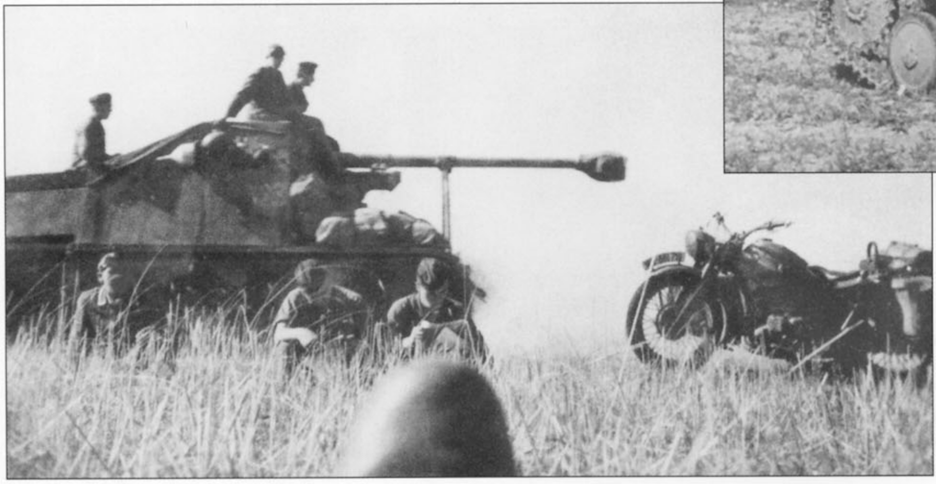




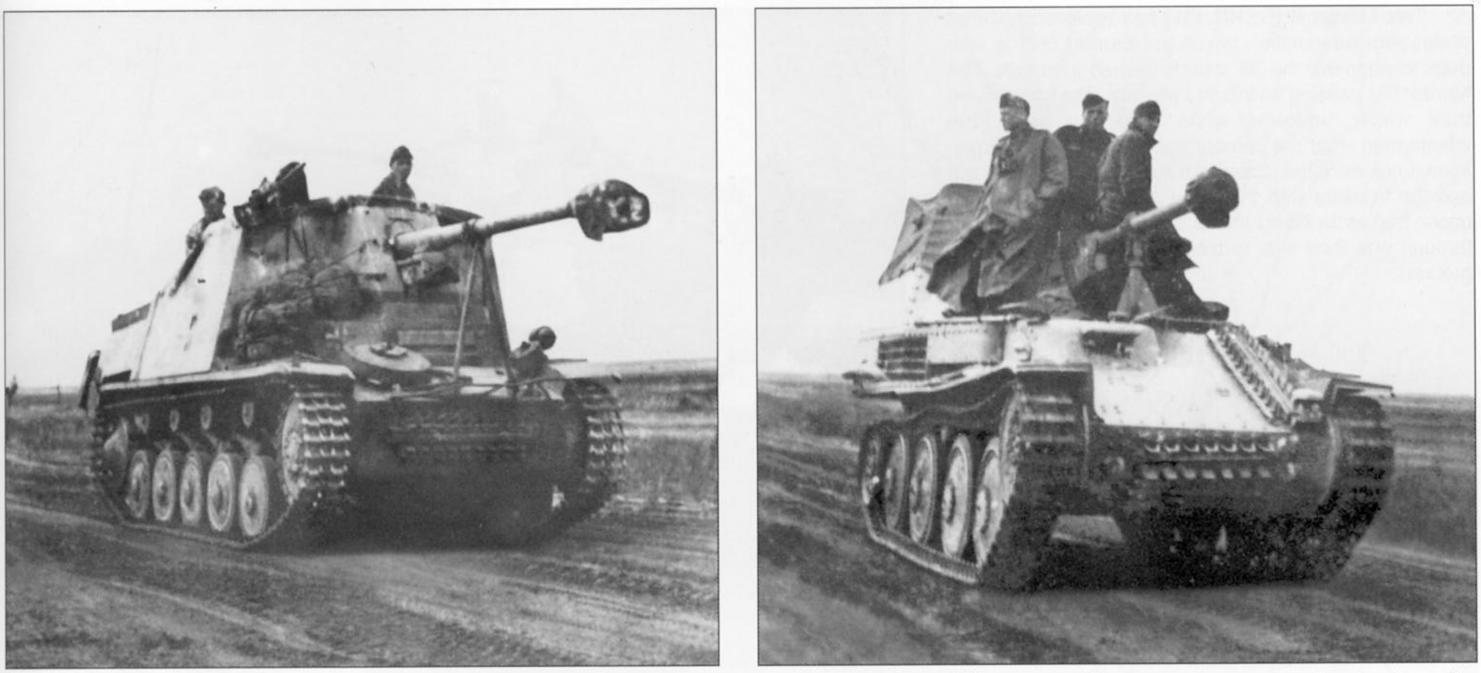
A Marder II (Sd.Kfz.131) has pulled on to the Russian roadside to allow a Pz.Kpfw.IV to pass. This appears to be the spring of 1943 and the troops are wearing the insulated winter uniform with the camouflage side out and the white side in.

This Marder II (Sd.Kfz.131) has a light green camouflage pattern sprayed lightly over its dark yellow base. The "333" tactical number is probably red. The white outline on the black Balkenkreuz has been itself trimmed with a thin black border, a less than common practice until later in the war. Note the tarp-covered 7.5cm ammunition boxes on the rear deck.

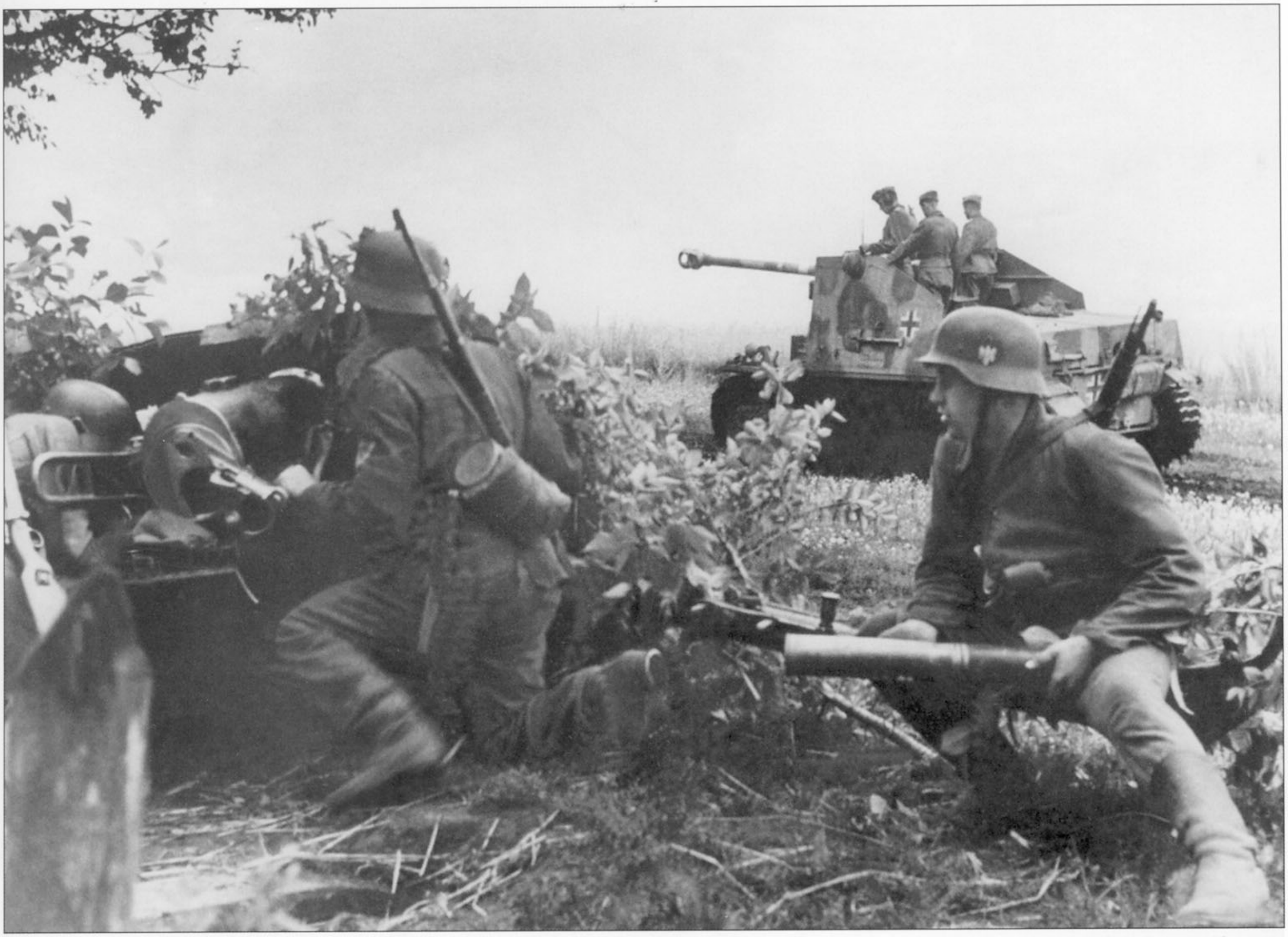




A Marder II passes a resting motorcycle crew, who are ignoring the dust. Note the tarp partly covering the gun compartment.

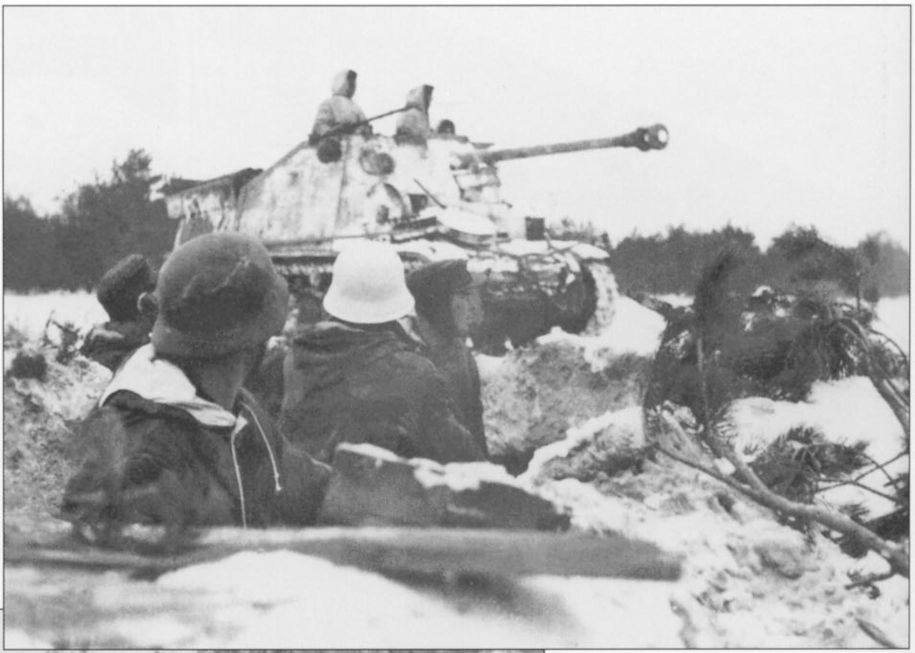


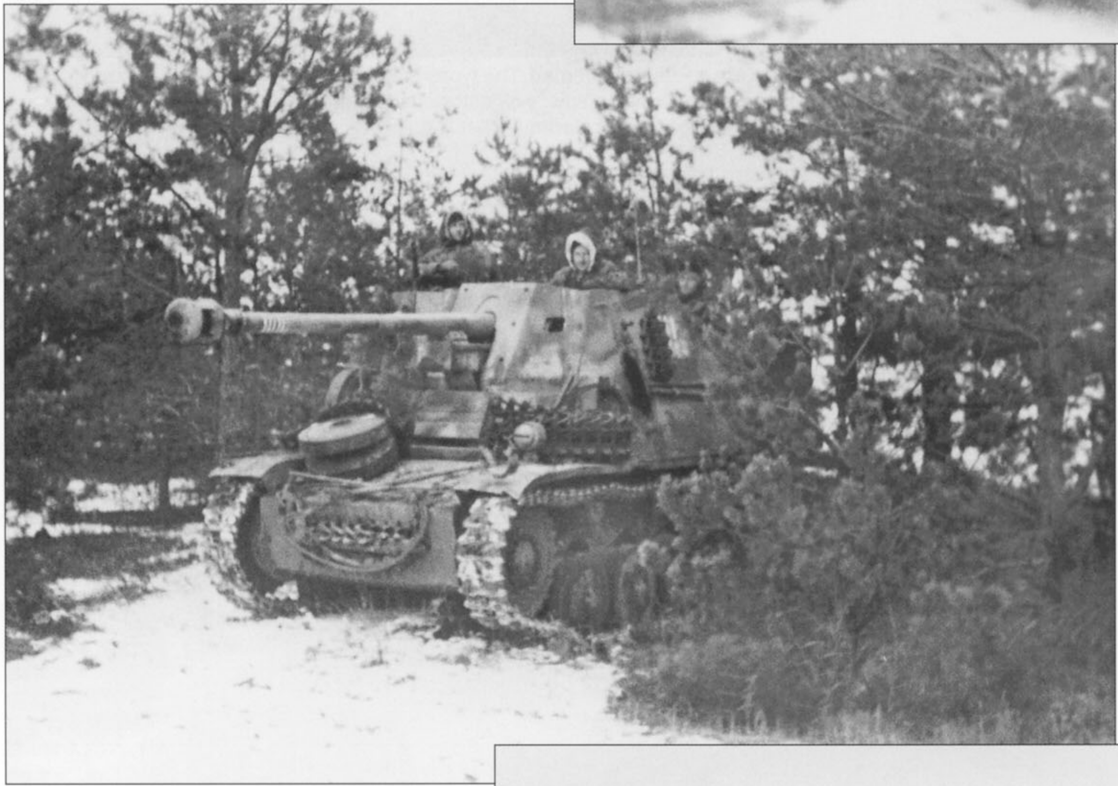
A Marder II (Sd.Kfz.131) (left) and a Marder III Ausf.M (Sd.Kfz.138) roll down a Russian dirt road. The types of Marders were occasionally mixed in units, although it was more common for a battalion to be equipped with a single type. The German soldier was astonished at the limited number of roads in Russia and their extremely poor quality. Most were dirt and deteriorated quickly under the masses of German wheels and tracks.



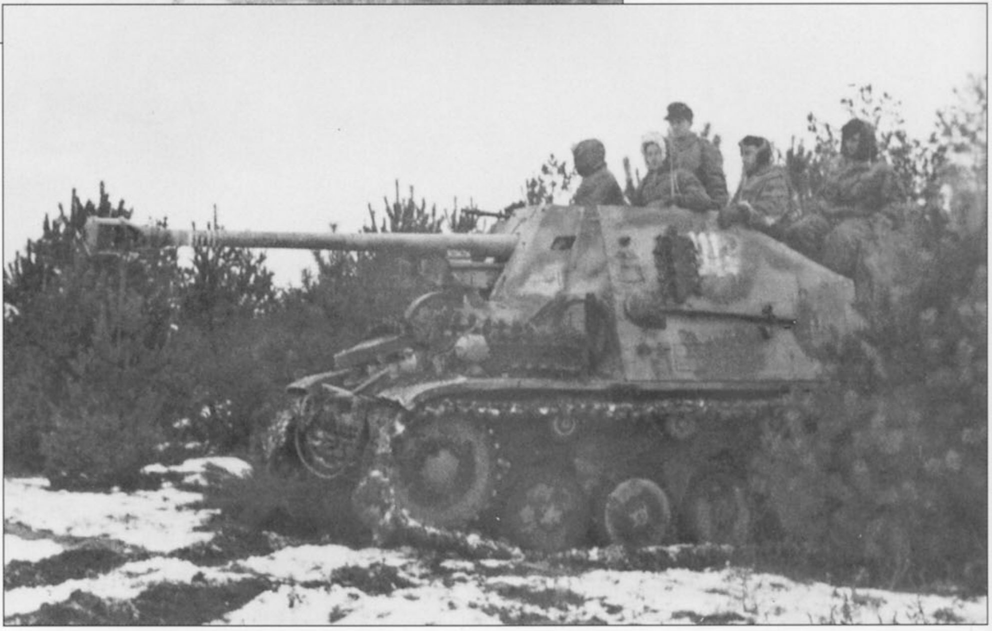
A Marder II (Sd.Kfz.131) passes the crew of a 7.5cm PaK 97/38 antitank gun. This was a French 75mm M1897 field gun barrel mounted on a German 5cm PaK 38 carriage for emergency use after the widespread appearance of the T-34 tank. They used French and Polish armor-piercing ammunition as well as German-produced hollow-charge rounds. Antitank crewmen were expected to keep their carbines slung because of the necessary for extremely rapid gun displacement. The Marder is painted with large irregular spots of dark green on its dark yellow base, far too contrasting with the green spots' sharply defined edges to be fully effective. This view of the Marder demonstrates just how exposed the crew was to the rear to artillery and mortar bursts.

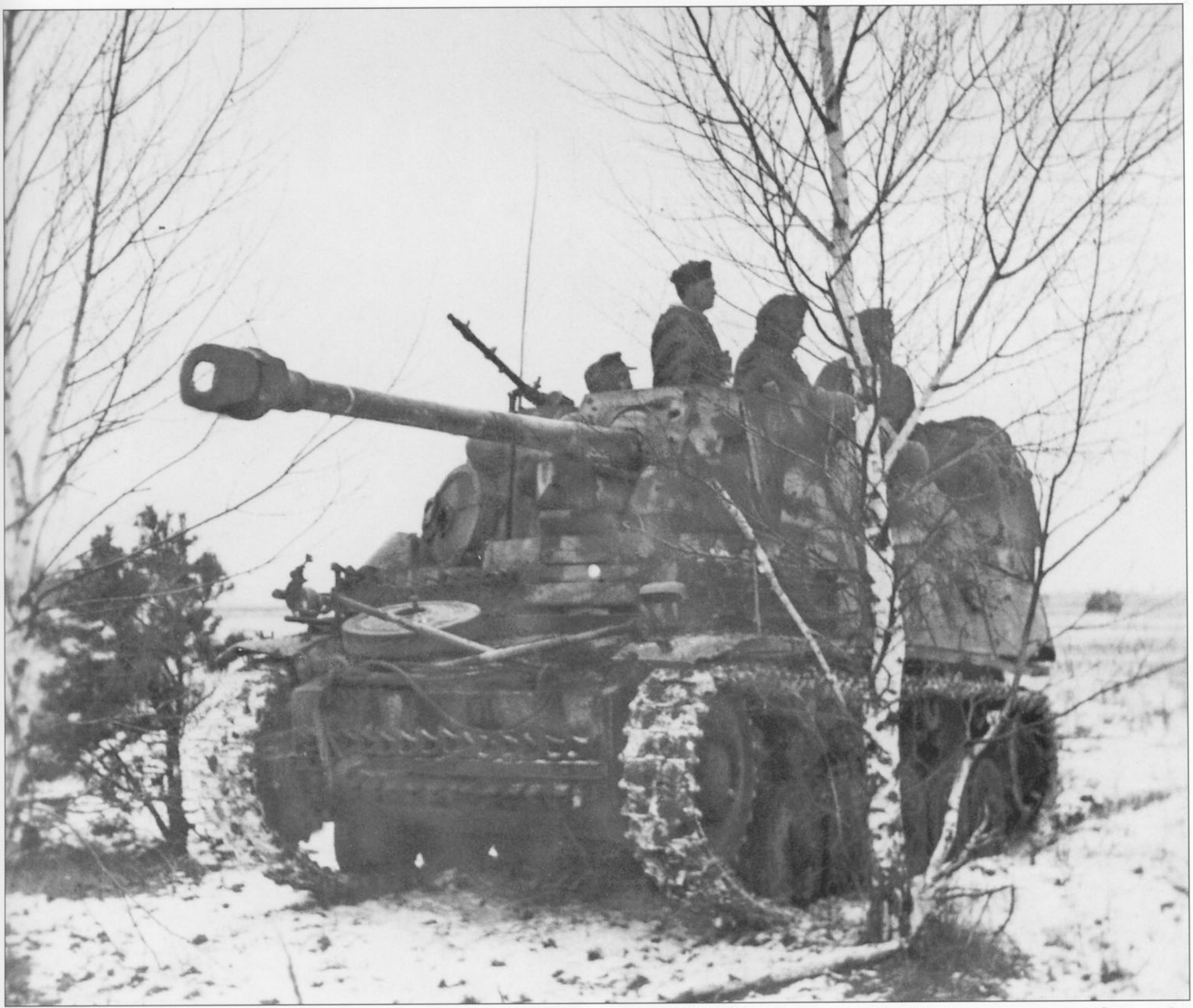
This Marder II (Sd.Kfz.131) has received a winter whitewash. Ammunition boxes are carried on the rear deck to augment the 37 rounds carried internally. The Marder II is passing an infantry position. The crew wears their winter uniforms white side out while the infantrymen wear the camouflage side out. Infantrymen sometimes wore the jacket with the camouflage side out and the trousers with the white out. This allowed their upper bodies to blend in the trees they were passing through and their legs to blend into the snow-covered ground.



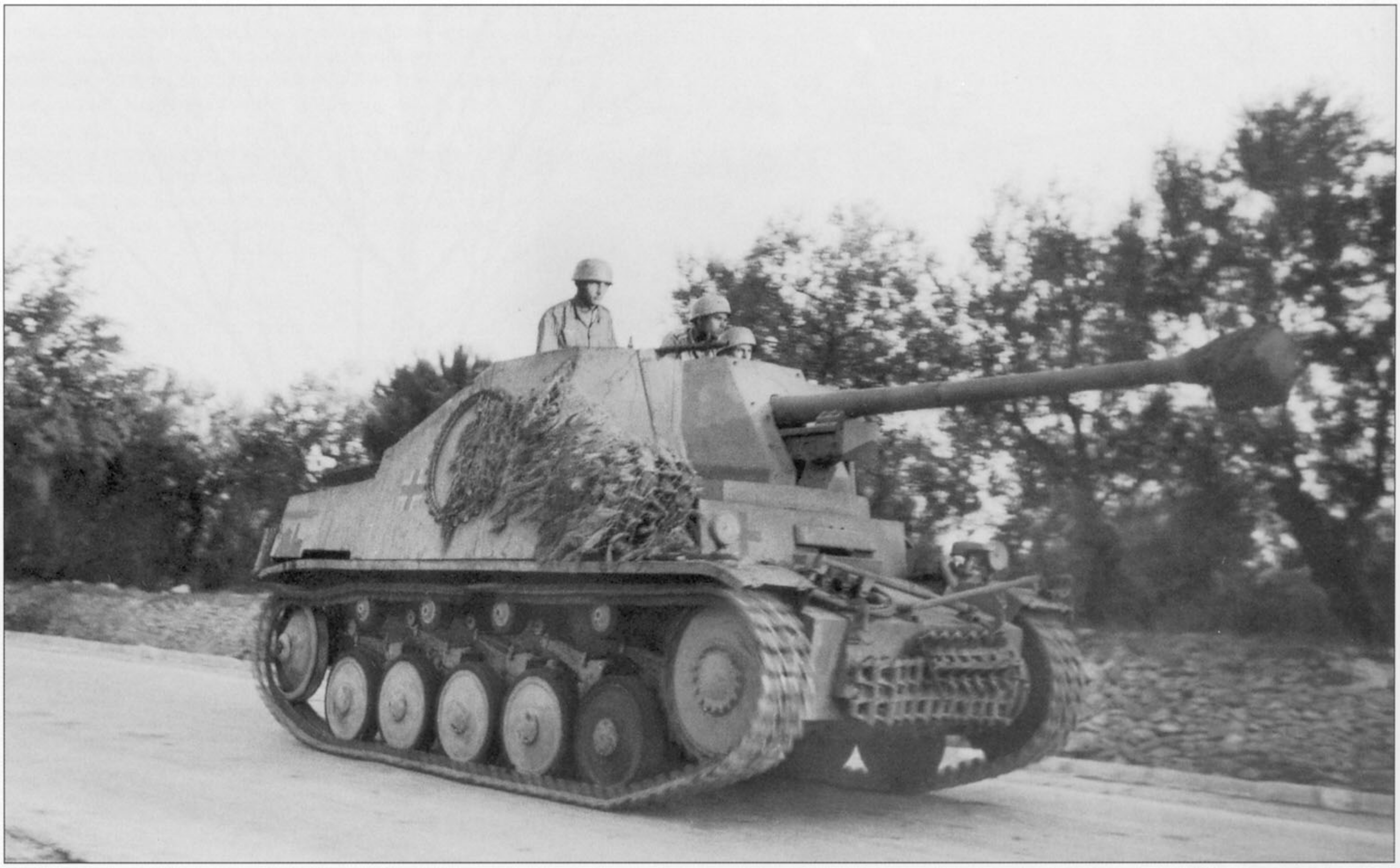


This Marder II (Sd.Kfz.131) is backed into woods for concealment. Track sections and spare road wheels are fastened to the hull. The half-dozen white bands on the barrel are kill rings (Abschussringe) indicating the number of enemy vehicles this gun had destroyed. The crudely painted white tactical number is too obscured to make out. An MG-34 can be seen at the top right of the superstructure. The crew wears the insulated winter uniform with the camouflage side out.

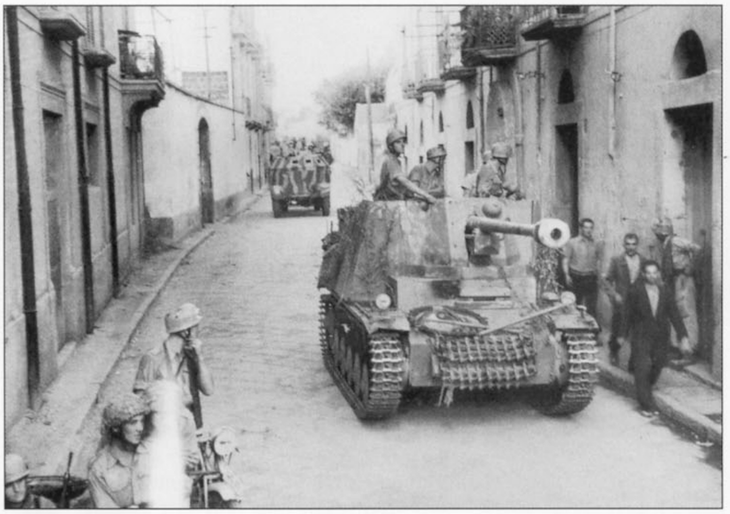




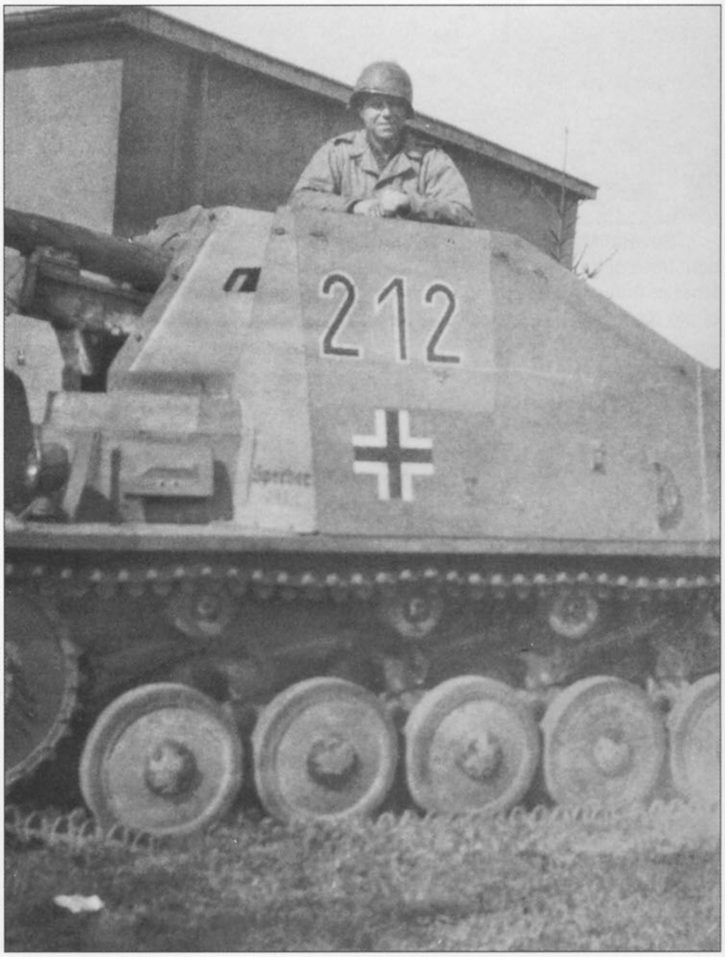
Several Marder II's in winter. It was common practice to secure spare road wheels and track sections to the front. Note that all mount an MG-34 on the right front of the gun compartment indicating their value as anti-personnel weapons. One (hull number 113) has its machine gun protected by a canvas cover. Most of these appear to be early winter, as whitewash has not been applied. The camouflage paint scheme may be red brown and olive green leaving little of the dark yellow base visible. The hull numbers (113, 122) are white.



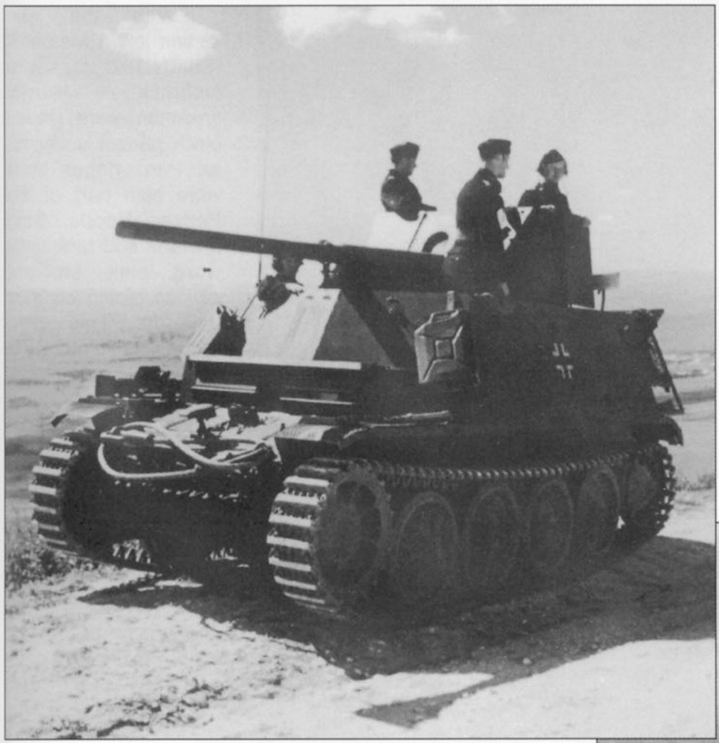
A Marder II of a Fallschirmtruppen (paratroopers) unit in Italy. The 1., 2., and 4.Fallschirmjäger-Divisionen fought in Italy. Note they are wearing the rimless M38 paratrooper steel helmet and sand-colored tropical uniforms. None of these men are parachute-qualified. By 1943 few members of the Fallschirmtruppen were. They have mounted an MG-34 atop the superstructure visible below the center crewman.



This Marder II of Panzer-Artillerie-Regiment Hermann Göring passing through an Italian village is camouflaged with olive green paint splotched over the dark yellow base. Note the tropical pith helmet hung on the front of the superstructure, common Luftwaffe issue in southern Europe. Following is a 2cm Flakvierling 38 auf schwerer Geländegängiger Lastkraftwagen 4.5tonne—a quad FlaK 38 mounted on a Mercedes-Benz L4500 4.5-ton truck with an armored cab and hood. It is painted with distinct dark green bands on dark yellow.

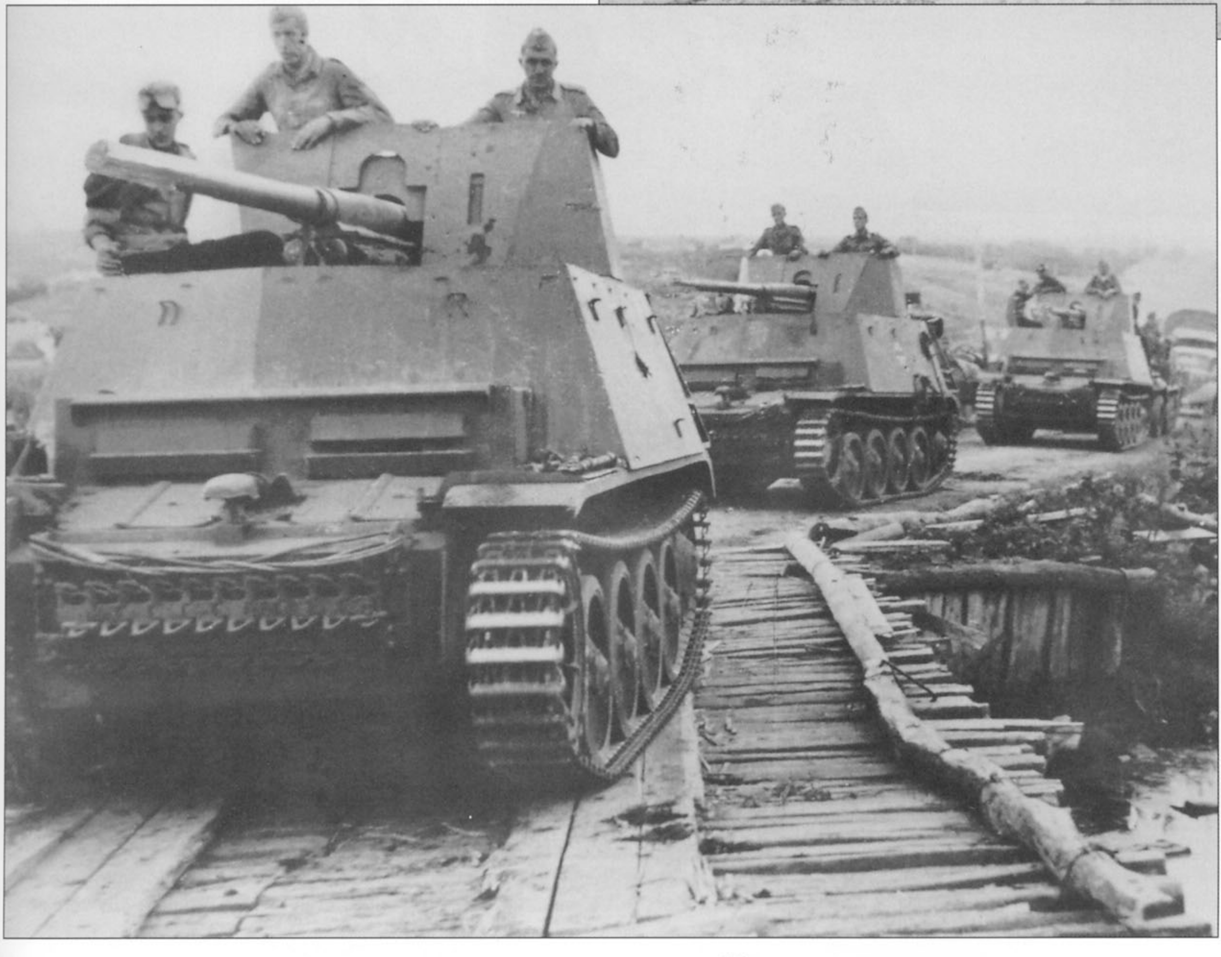


This 7.5cm PaK 40/2 auf Fahrgestell Pz.Kpfw.II (Sf.) Marder II, captured in Germany in 1945, has its gun traversed left to the maximum 32 degrees almost blocking the gun sight port; it traversed only 25 degrees to the right. The "212" vehicle number is probably red outlined in white, but might be black. The Balkenkreuz is lacking the outer narrow black edging.

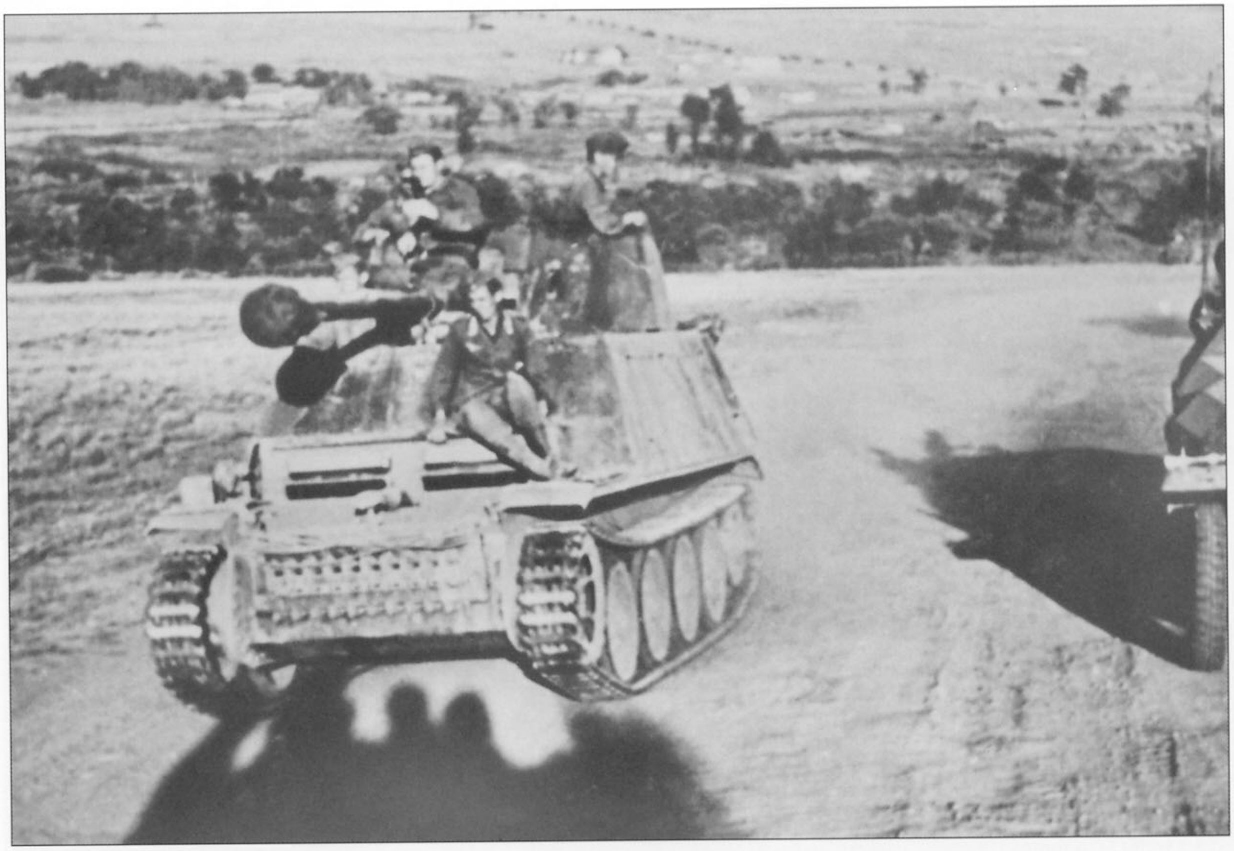


The Panzer Selbstfahrlafette 1 für 7.62cm PaK 36(r) auf Fahrgestell Pz.Kpfw.II Ausf.D1 und D2 (Sd.Kfz.132), while still designated the Marder II, was of a much different design than the Sd.Kfz.131. For all practical purposes it was an entirely different vehicle being built on Pz.Kpfw.II Ausf.D chassis and mounting former Soviet 76.2mm F-22 (M-1936) divisional field gun and designated the 7.62cm PaK 36(r) L/51.5 by the Germans. While primarily a field gun in Soviet service, it was designed to be an effective antitank gun as well. Some were rechambered for German 7.5cm PaK 40 ammunition and the muzzle brake removed. The vehicle had a rather high profile and the four-man crew was exposed even though the gun shield was fitted with side extensions. The Ausf.D1 were converted from Pz.Kpfw.II Ausf.D and E chassis while the Ausf.D2 was built on a Flammpanzer Pz.Kpfw.II(F) (Sd.Kfz.122) flamethrower tank chassis. The crew of this Marder II in Russia, September 1942, wear the black panzer uniform. 20-liter cans hang on the front superstructure. Not exactly a safe practice, but they may be filled with water, through water cans normally had large white crosses on the sides.

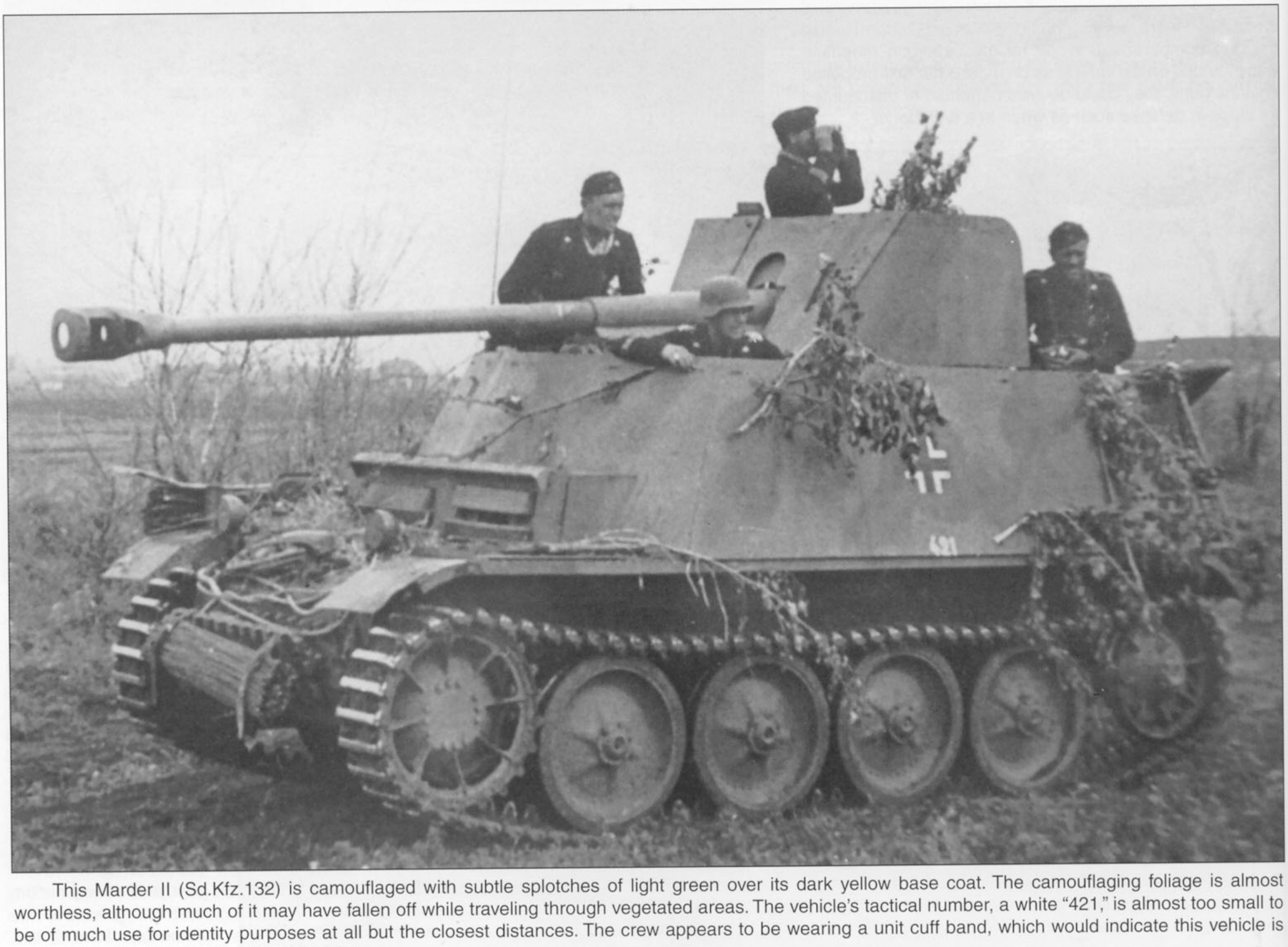
Another view of the same Marder II (Sd.Kfz.132). Rather than integrating the gun mounting into the superstructure, as on most other Marders, the gun was set atop the superstructure giving it a wider 50 degrees left and right traverse. Armor was 5-30mm. Thirty rounds of ammunition were stowed and an MG-34 was carried inside the gun compartment. While no machine gun mounting was provided on the vehicle as on most other self-propelled antitank guns, they could be fired handheld or dismounted for close-in defense such as when in a night lager.



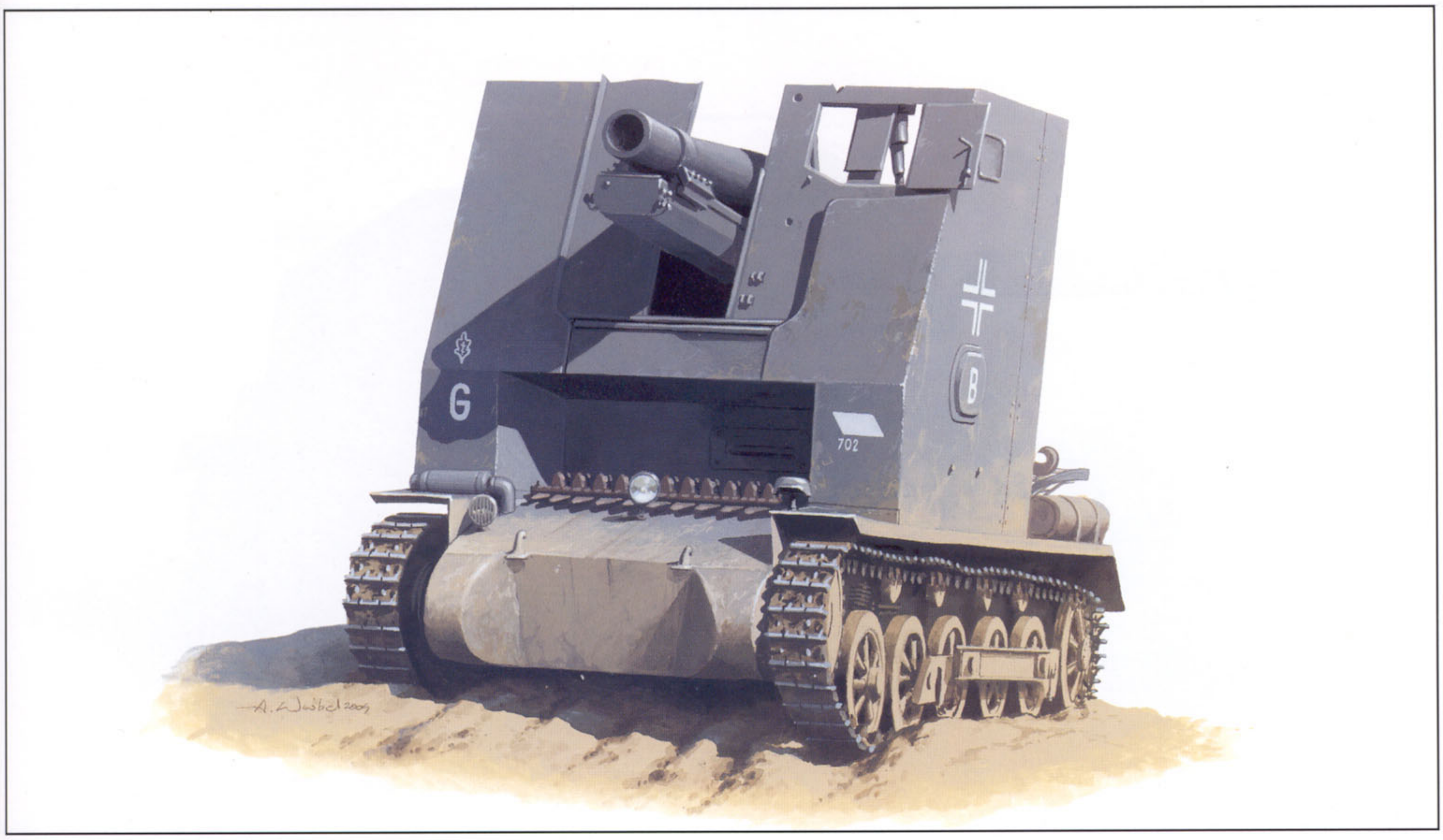
A battery of Marder II's (Sd.Kfz.132) armed with 76.2mm guns cross a typically crude Russian bridge. The muzzle brakes on these vehicles were inexplicably obscured. German pioneers would sometimes reinforce the pilings and abutments to support the constant passage of heavy vehicles. They would also spend a great deal of time and effort maintaining existing bridges as time usually did not permit the luxury of replacing them with more robust structures. On the center of the upper glacis is a hooded Notek-tarnlicht (blackout light), which cast a dim illumination on to the ground in the immediate front of the vehicle.



With the sun setting low a Marder II (Sd.Kfz.132) passes a halftrack. Marder crewmen were issued black panzer uniforms, as Panzerjäger units were also part of the Panzer Troops. Both antitank and tank units wore pink arm of service piping on their uniforms. This crew though is clothed in field gray uniforms. They may have been converted from a towed Panzerjäger unit and have not yet been issued black uniforms.

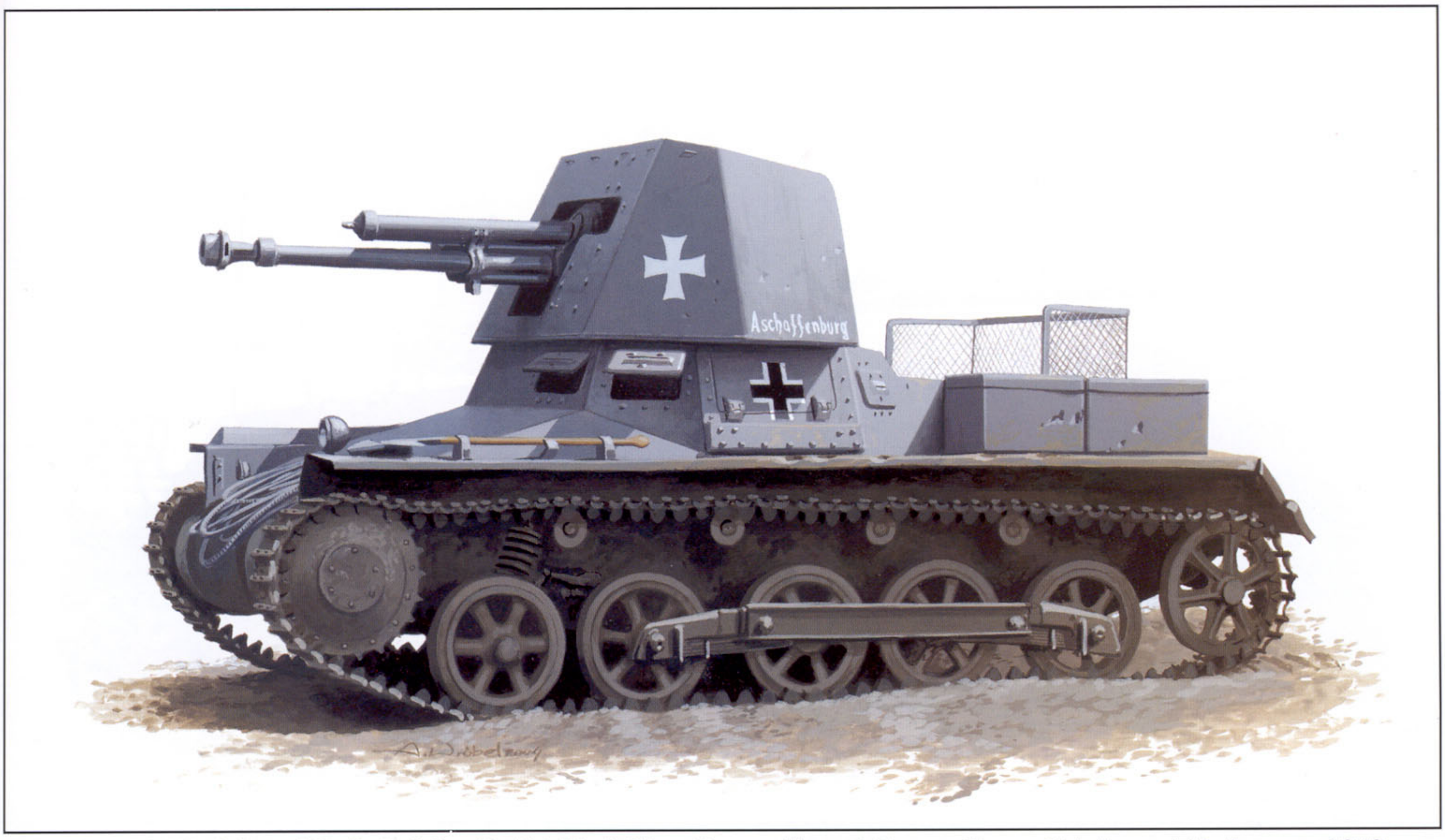


This Marder II (Sd.Kfz.132) is camouflaged with subtle splotches of light green over its dark yellow base coat. The camouflaging foliage is almost worthless, although much of it may have fallen off while traveling through vegetated areas. The vehicle's tactical number, a white "421," is almost too small to be of much use for identity purposes at all but the closest distances. The crew appears to be wearing a unit cuff band, which would indicate this vehicle is assigned to the 'Großdeutschland' Division.



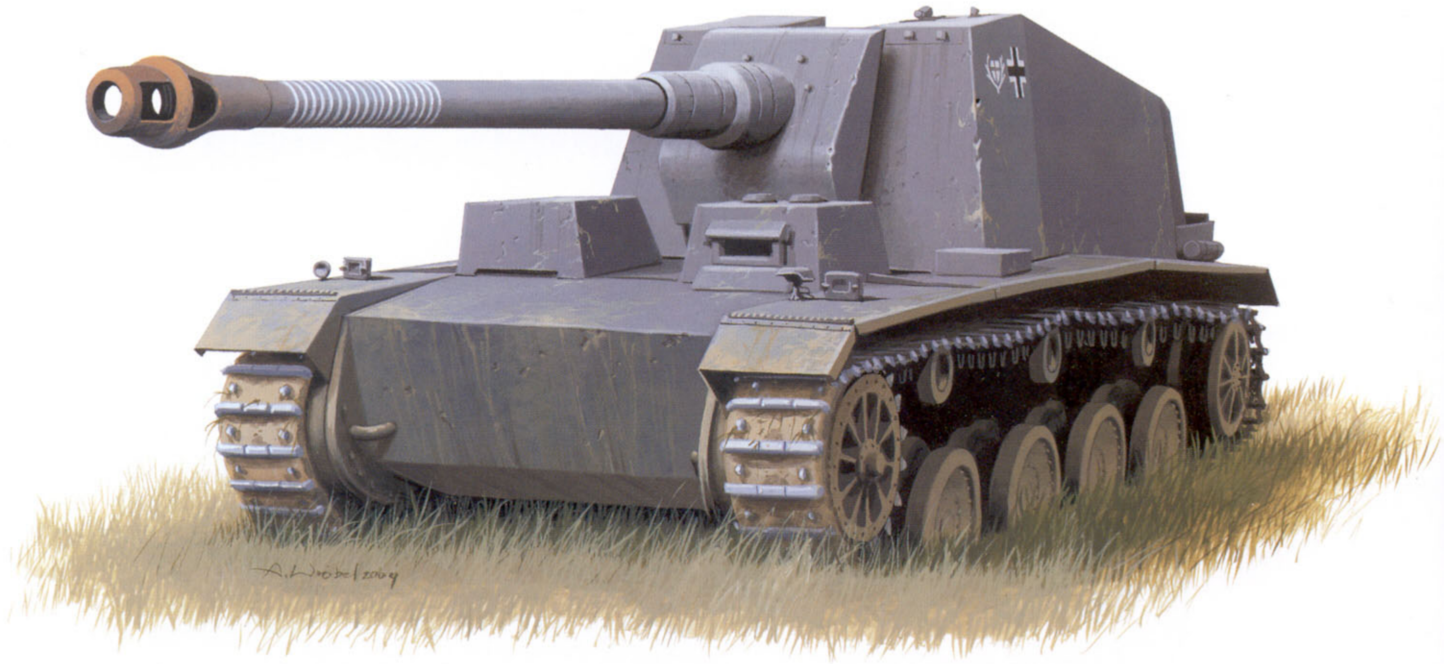
**15cm s.I.G.33/1(Sf.) auf Pz.Kpfw.I Ausf.B (Sd.Kfz.101), 702.Infanterie-Geschütz-Kompanie, 1.Panzer-Division, Besancon, France, June 1940**

The oak leaf insignia is that of 1.Panzer-Division, the "G" identifies it as being under Panzergruppe Guderian, the rhomboid-shaped tactical symbol identifies the unit as part of the Panzer Troops, and the "B" indicates it is the second gun within the battery. A narrow white outline Balkenkreuz was painted on the dark gray base color.



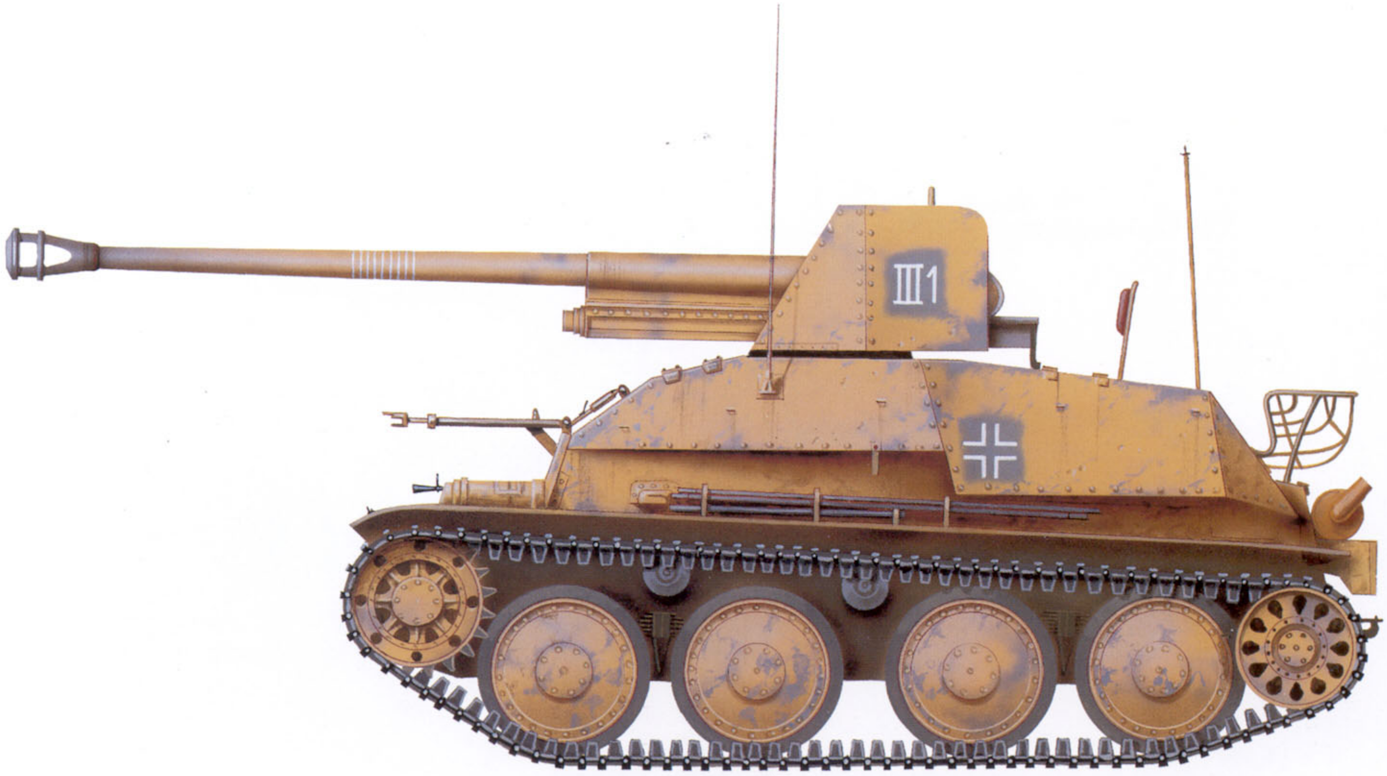
**4.7cm PaK 36(t) (Sf.) auf Pz.Kpfw.I Ausf.B (Sd.Kfz.101) or Panzerjäger I, Panzerjäger-Abteilung 643, France, 1940**

The white Maltese cross was a unit insignia and was painted on both sides of the superstructure and on the hinged left rear fender. "Aschaffenburg" is the name of the city that the unit's home garrison was located in. From 1940 to early 1943 most armored fighting vehicles were painted dark gray (RAL 7021).



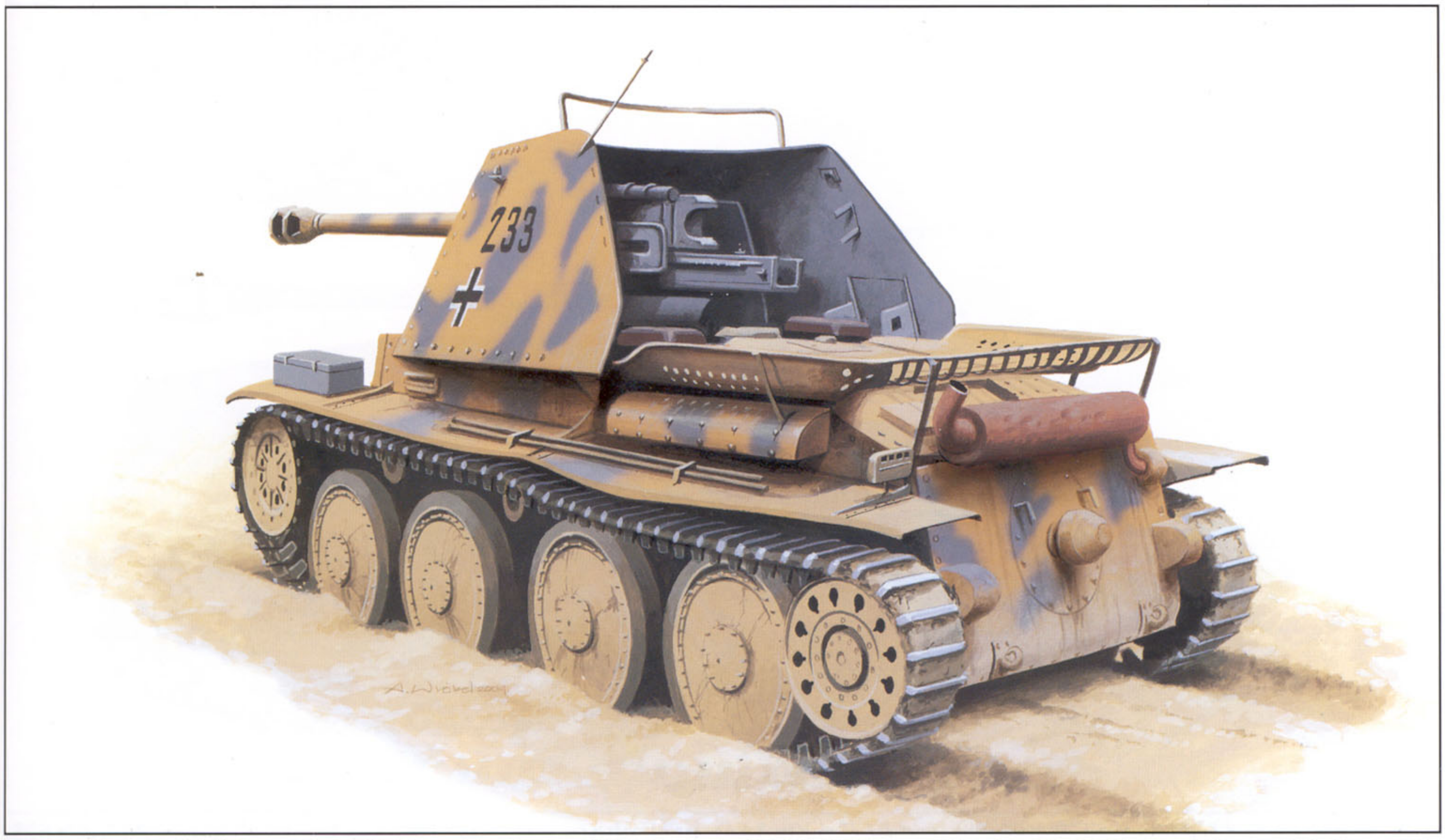
**12.8cm Selbstfahrlafette L/61 (Panzerselbstfahrlafette V), schwere Panzerjäger-Abteilung 521, Eastern Front, summer 1942**

Only two vehicles were built on prototype VK.3001(H) chassis mounting the 12.8cm K L/61 gun. Bearing kill rings on the barrel, it is painted solid dark gray (RAL 7021). The battalion's insignia is beside the Balkenkreuz. This was the only unit to be equipped with this hybrid vehicle.



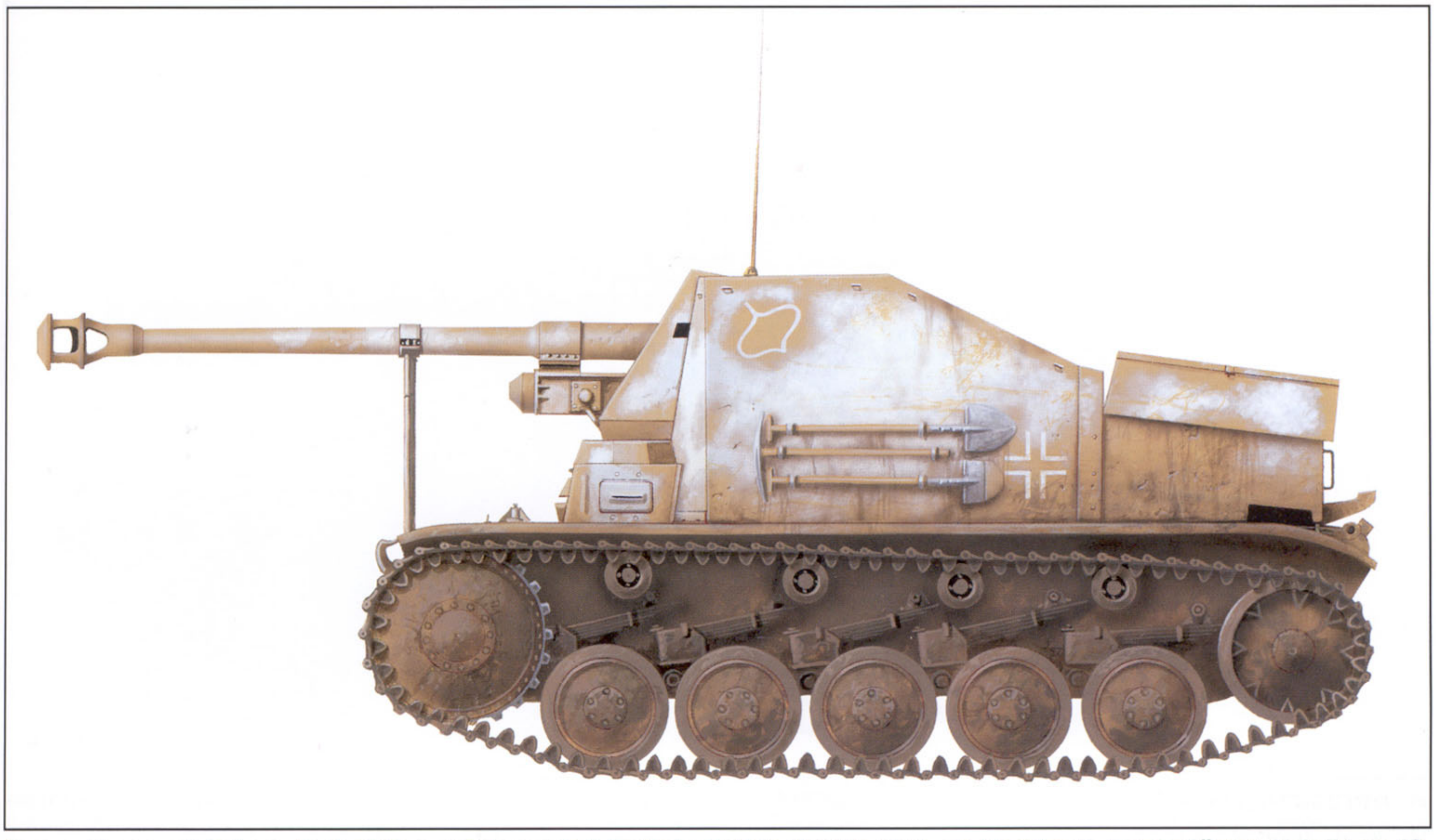
**Panzerjäger 38(t) für 7.62cm PaK 36(r) (Sd.Kfz.139), or Marder III, Panzerjäger-Abteilung 33, 15.Panzer-Division, Deutsches Afrikakorps, El Alamein, October 1942**

The European dark gray (RAL 7021) has been over-sprayed with sand yellow (RAL 8000). The sand yellow was sprayed around the original white outline Balkenkreuz and tactical number making unusual use of a Roman numeral.



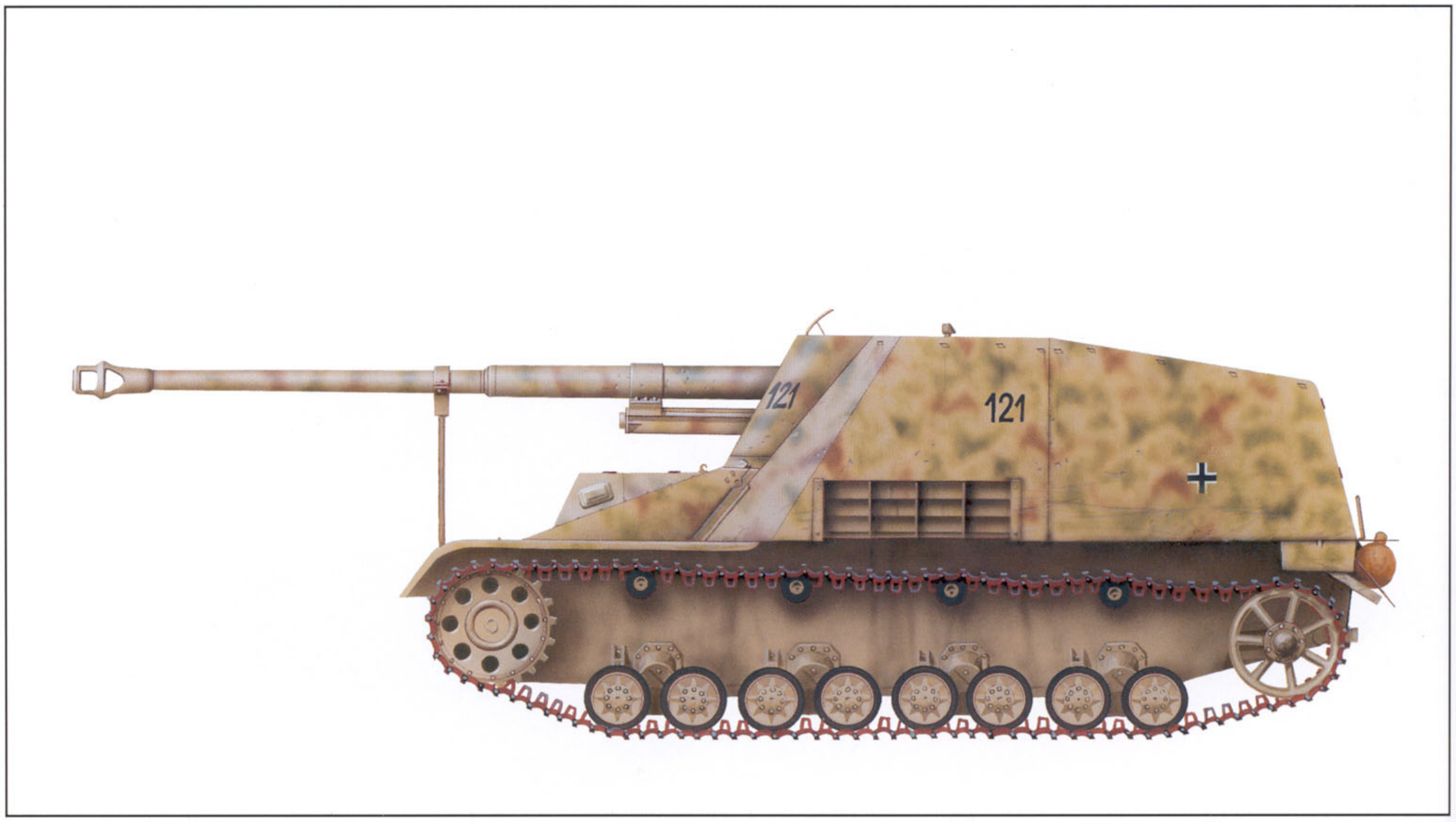
**Panzerjäger mit 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Ausf.H (Sd.Kfz.138), or Marder III, 2./Panzerjäger-Abteilung 39, 21.Panzer-Division, Tunisia, March 1943**

The European dark gray (RAL 7021) was over-sprayed with sand yellow (RAL 8000) leaving irregular gray spots of the base coat. The interior was left gray. The vehicle's tactical number identifies it as 2nd Company, 3rd Platoon, Number 3 gun.



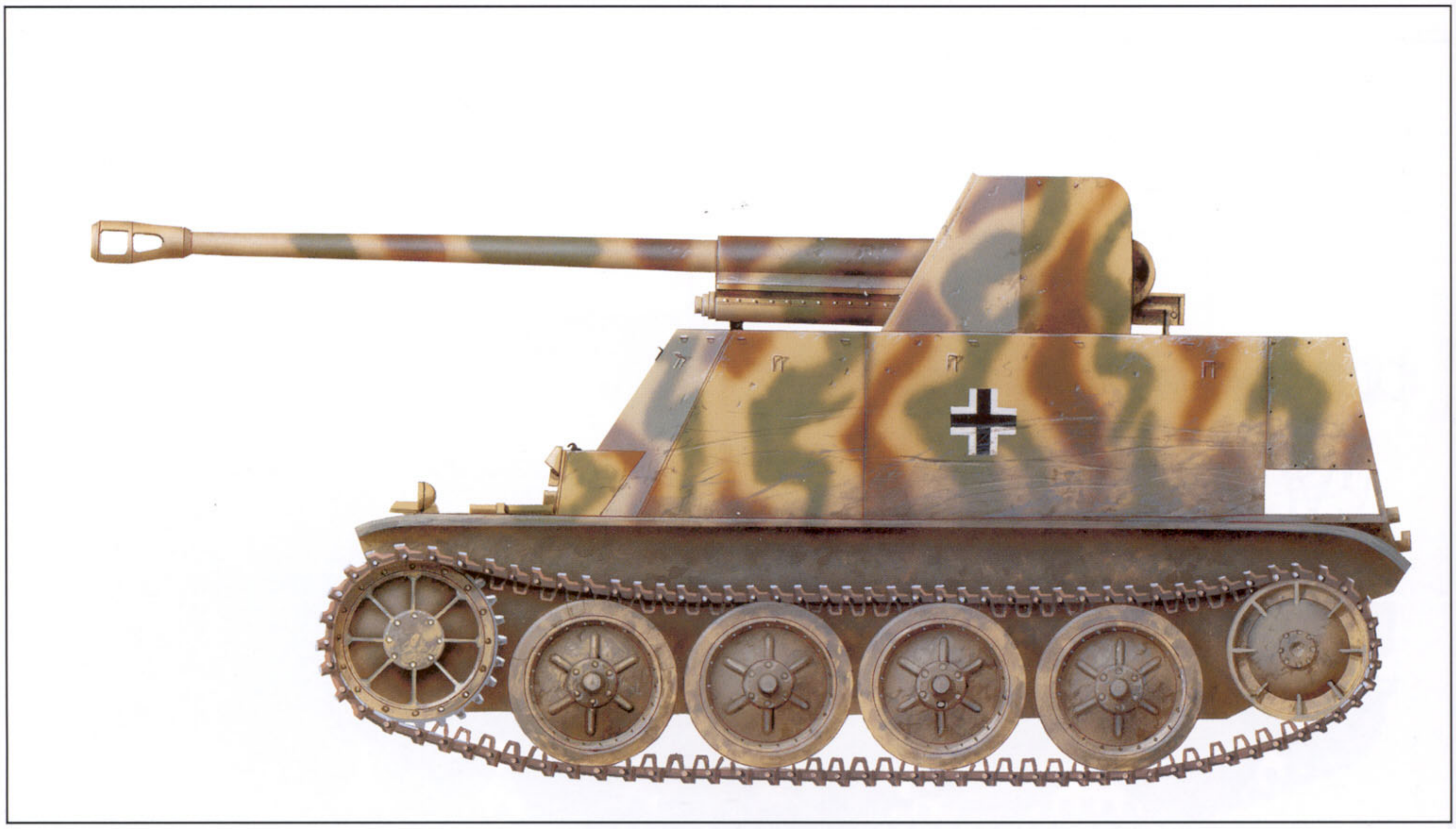
**Panzerjäger mit 7.5cm PaK 40/2 auf Fahrgestell Pz.Kpfw.II (Sf.) (Sd.Kfz.131), or Marder II, Panzerjäger-Abteilung 49, 4.Panzer-Division, Eastern Front, 1944**

The unit insignia and Balkenkreuz are painted in a white outline. The dark yellow (RAL 7028) base coat has had a light irregular coat of white (RAL 9002) sprayed on.



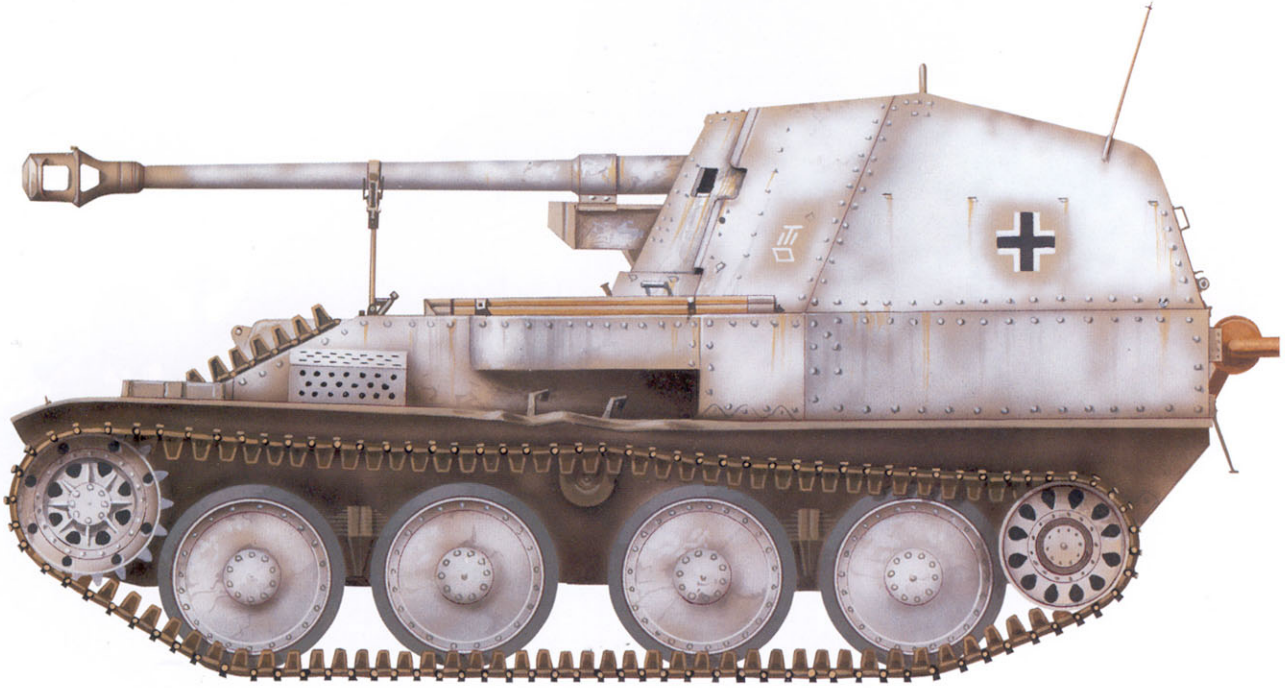
**8.8cm PaK 43 auf Fahrgestell Pz.Kpfw.III und IV (Sd.Kfz.164), or Nashorn, schwere Heeres-Panzerjäger-Abteilung 525, Italy, 1944**

Small splotches of olive green (RAL 6003) and red brown (RAL 8017) have been sprayed over the dark yellow (RAL 7028) base coat. The black tactical number of the sides and left shield identifies this vehicle as 1st Company, 2nd Platoon, Number 1 gun.



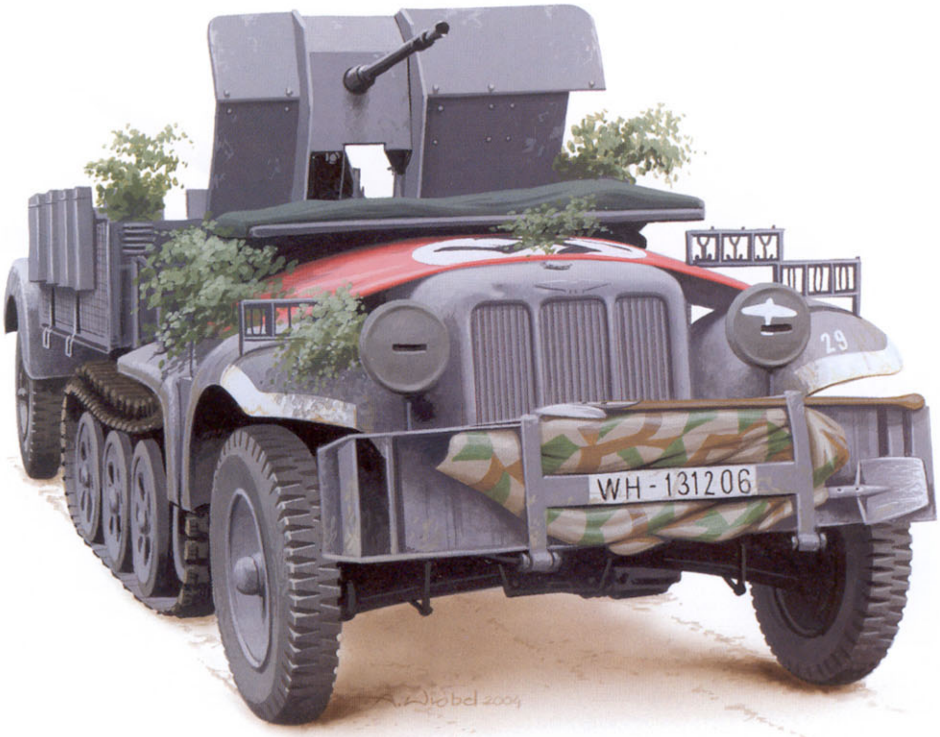
**Panzer Selbstfahrlafette 1 für 7.62cm PaK 36(r) auf Fahrgestell Pz.Kpfw.II Ausf.D (Sd.Kfz.132), or Marder II, 5.SS-Panzer-Division "Wiking," Poland, 1944**

From early 1943, armored fighting vehicles were factory-painted a dark yellow (RAL 7028) base color over which one or two other colors could be applied by the unit appropriate for the vegetation and terrain they were operating in a suitable camouflage pattern. The most commonly applied colors were dark olive green (RAL 6003) and red brown (RAL 8017). A common alternate color was olive green (RAL 8002). A standard white outlines black Balkenkreuz is painted on each side of the superstructure.



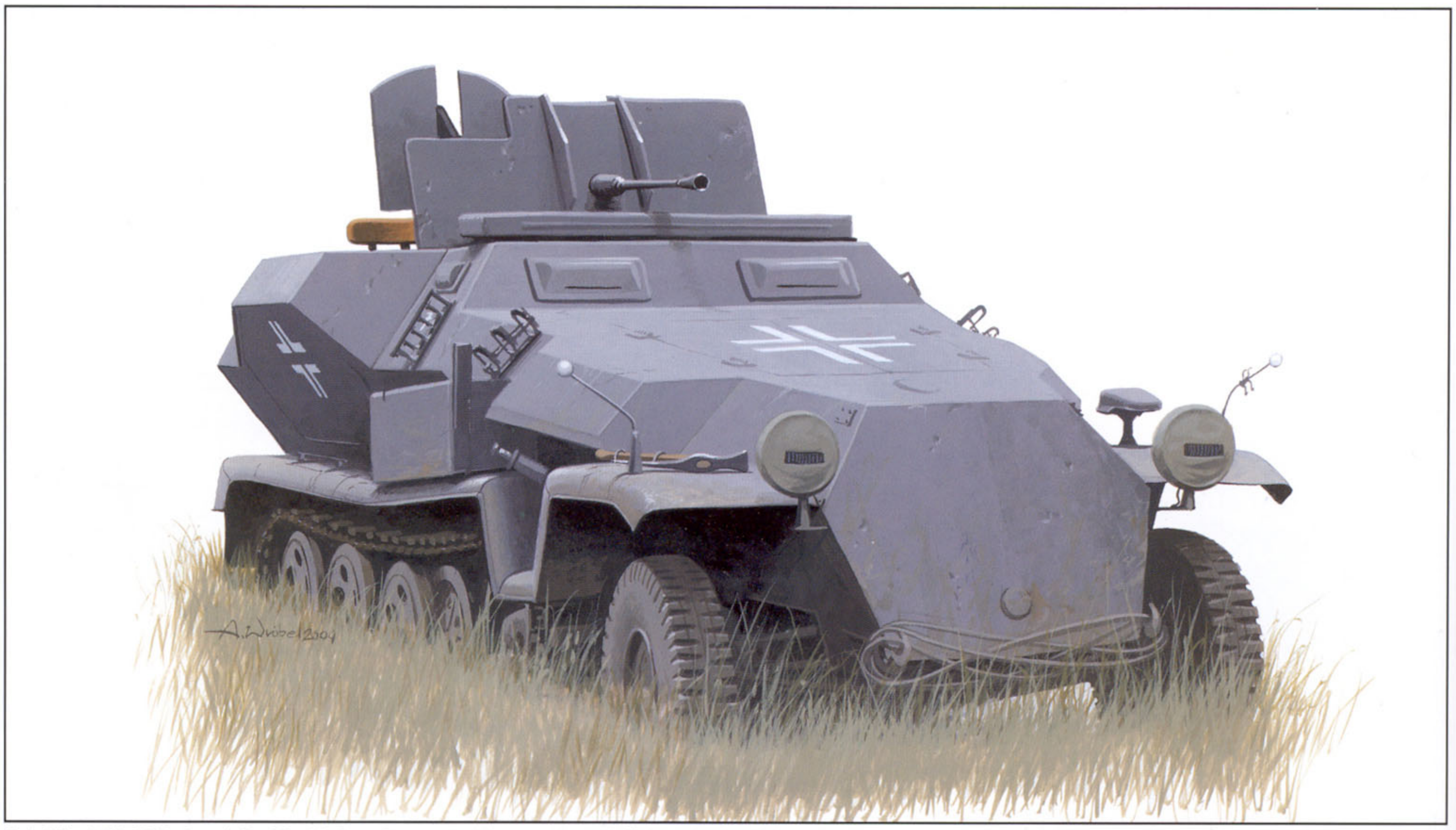
**Panzerjäger mit 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Ausf.M (Sd.Kfz.138), or Marder III, Panzerjäger-Abteilung 113, Eastern Front, winter 1944**

The vehicle has been lightly whitewashed over its dark yellow (RAL 7028) base leaving the Balkenkreuz and tactical symbol exposed. The tactical symbol indicates it is assigned to a Panzerjäger-Abteilung.



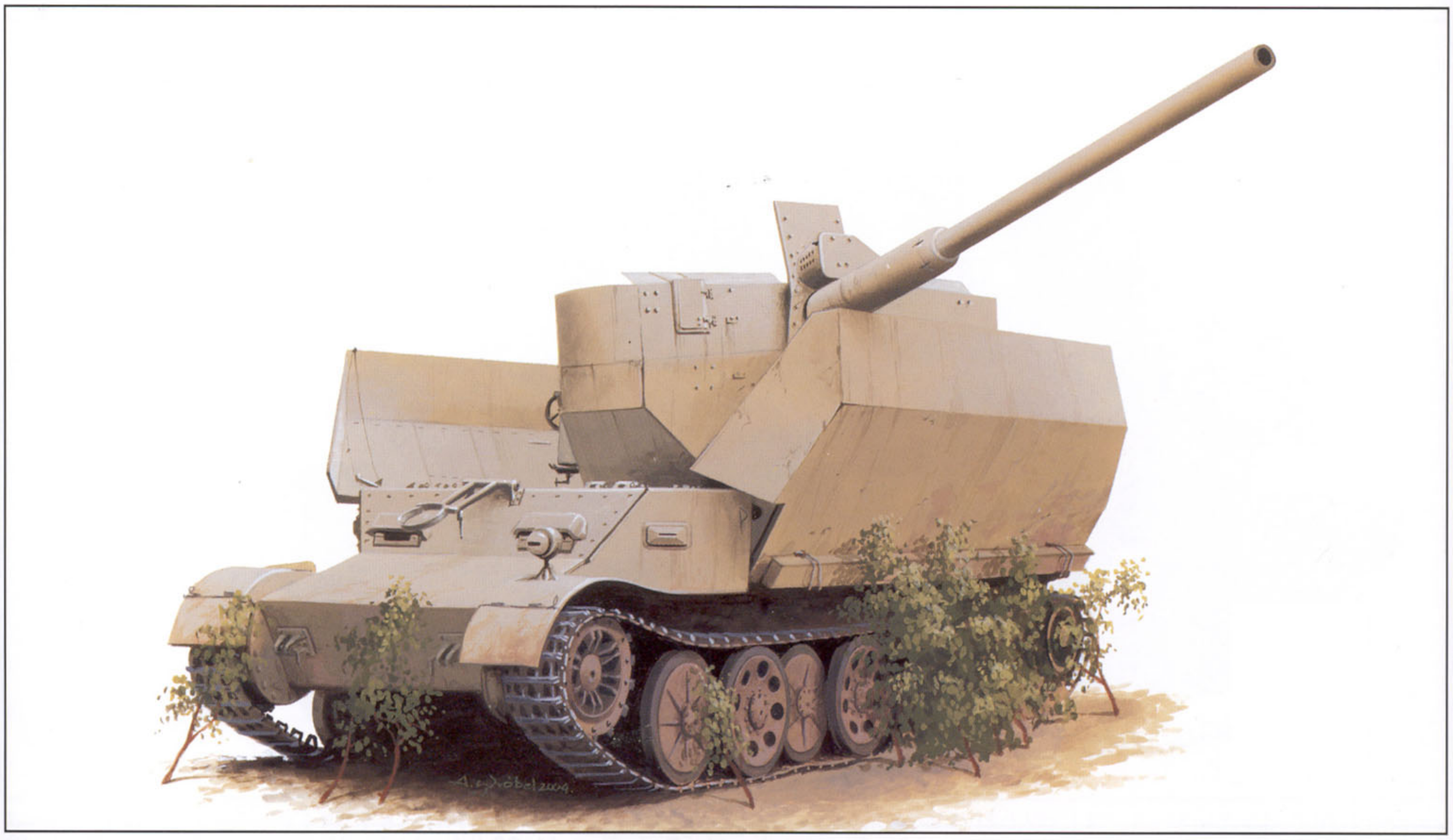
**Sd.Kfz.10/4 halftrack mounting a 2cm FlaK 30, Fliegerabwehr-Bataillon 46, 29.Infanterie-Division (mot.), France, 1940**

The halftrack and its ammunition trailer are dark gray (RAL 7021). The white edging on the front fenders was a common peacetime and early wartime means of making the vehicles more visible at night for safety reasons. The aircraft silhouette on the headlight's blackout cover indicates the number of kills. A national flag has been secured to the hood as an air recognition means for aircraft.



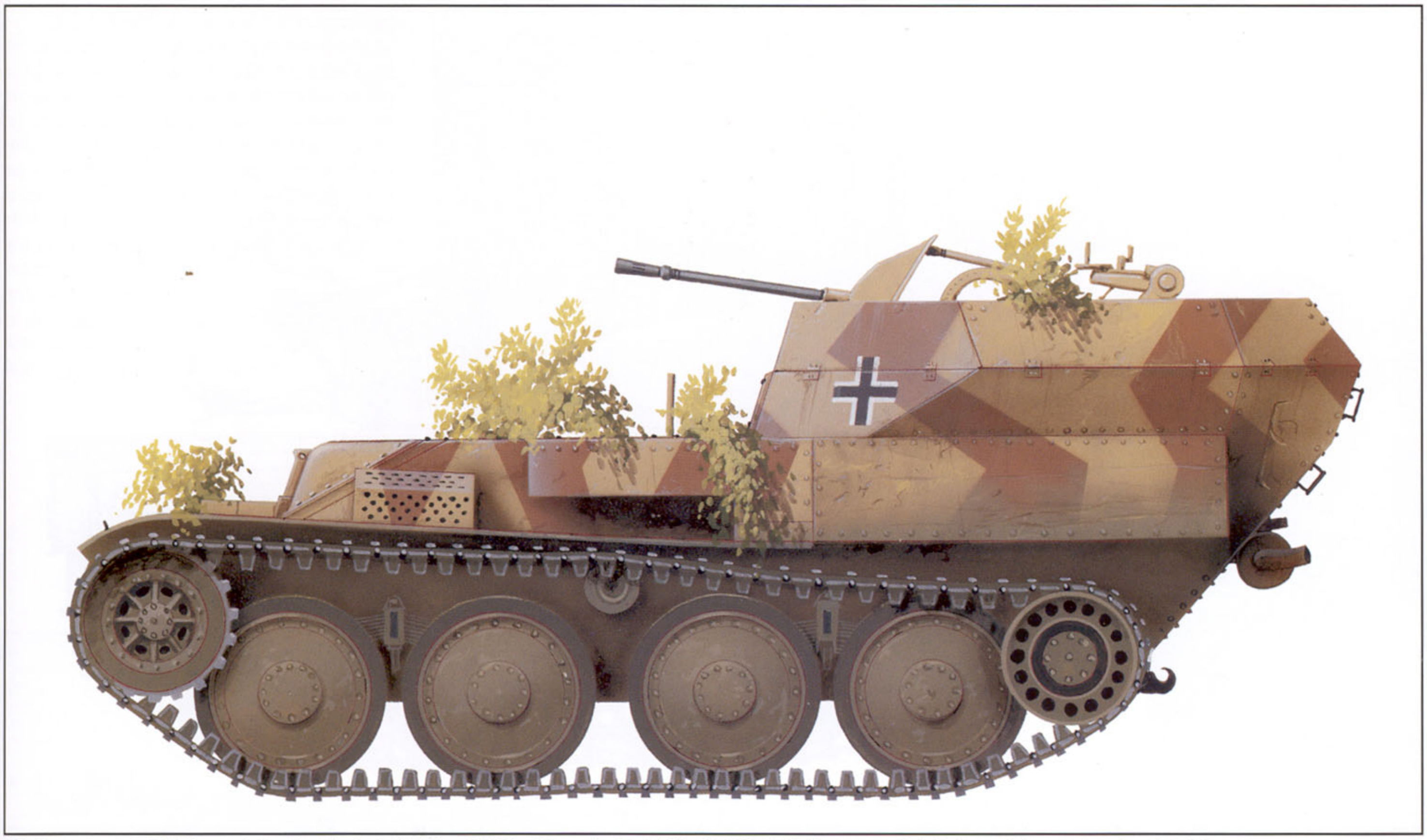
**Sd.Kfz.251/17 Ausf.C, FlaK-Regiment "Hermann Göring," 1942**

In 1942, 10 of these experimental half-tracks were built for the Luftwaffe on a modified Sd.Kfz.251 Ausf.C chassis and a 2cm FlaK 38 installed on a raised platform inside the vehicle. The sides could be lowered for more working space, but the weapon could be operated with the sides raised. However, it was too complex and expensive and no further vehicles were produced. The flat box on the roof above the driver contains spare barrels. It is painted dark gray (RAL 7021) with a white-outlined Balkenkreuz.



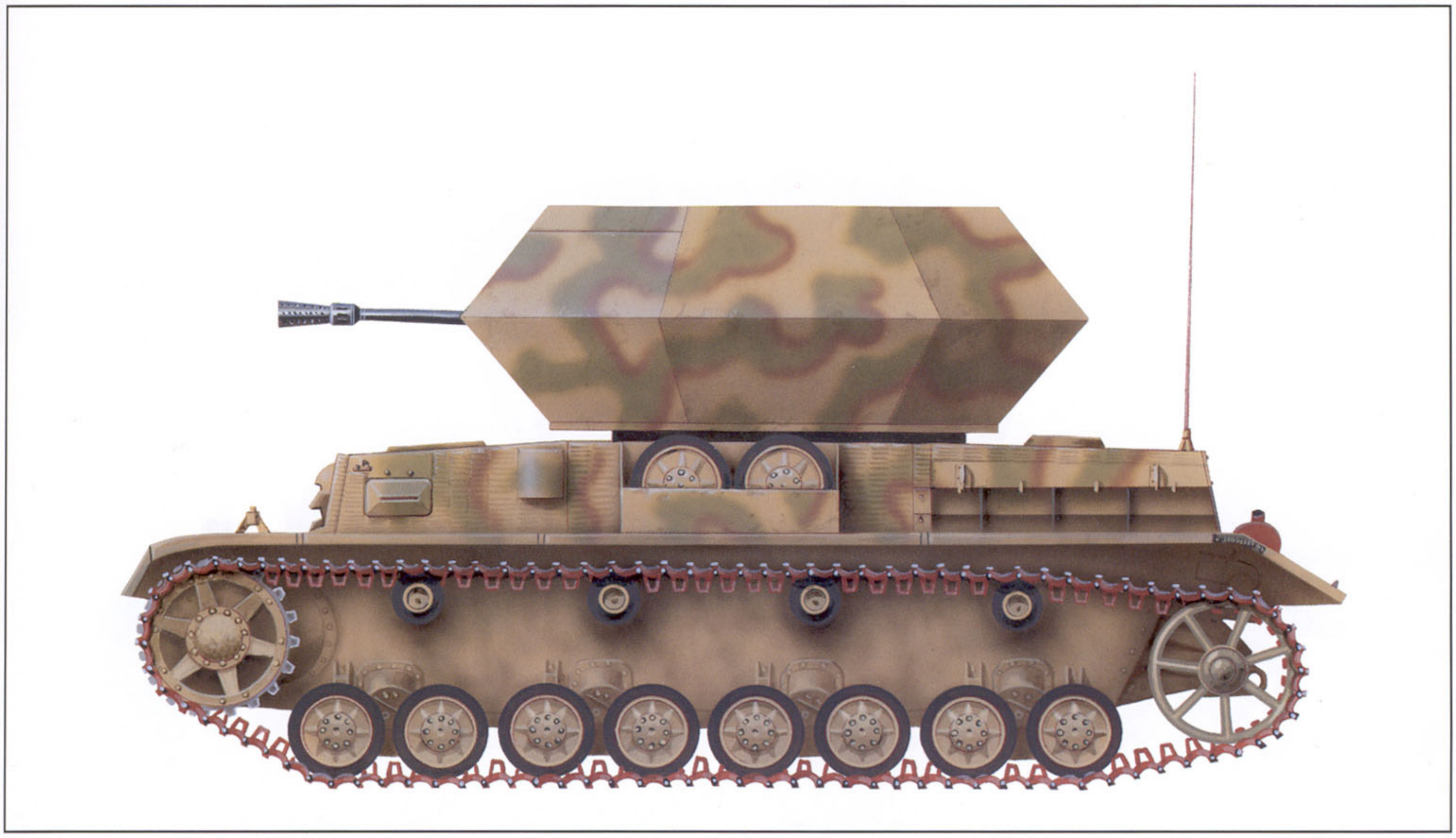
**8.8cm FlaK auf Sonderfahrgestell (Pz.Sfl.IVc), Germany, spring 1944**

This was an experimental effort first proposed in June 1942 of mounting an 8.8cm FlaK 41 antiaircraft gun on a fully tracked chassis to provide Panzer divisions with self-propelled heavy flak. The sides and rear could be lowered to provide a large platform for the crew. This vehicle is painted solid dark yellow (RAL 7028). The 8.8cm FlaK 41 was replaced by an 8.8cm FlaK 37 in March 1944 and the vehicle sent to Italy for trials with 26.Panzer-Division.



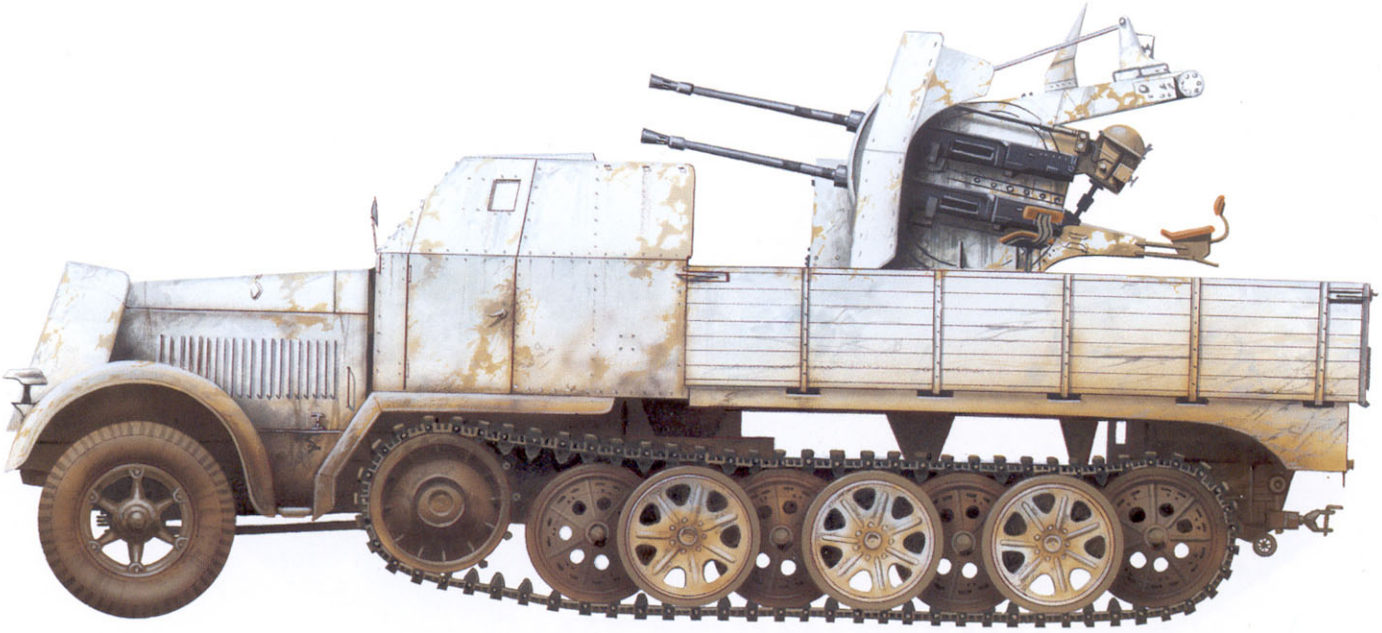
**Flakpanzer 38(t) auf Selbstfahrlafette 38(t) (2cm) (Sd.Kfz.140), 21.Panzer-Division, Normandy, 1944**

From November 1943 to February 1944, the firm B.M.M. manufactured 141 of these diminutive Flakpanzers and all were issued to Panzer divisions in the West. A red brown (RAL 8017) splinter pattern has been painted over the dark yellow (RAL 7028) base.



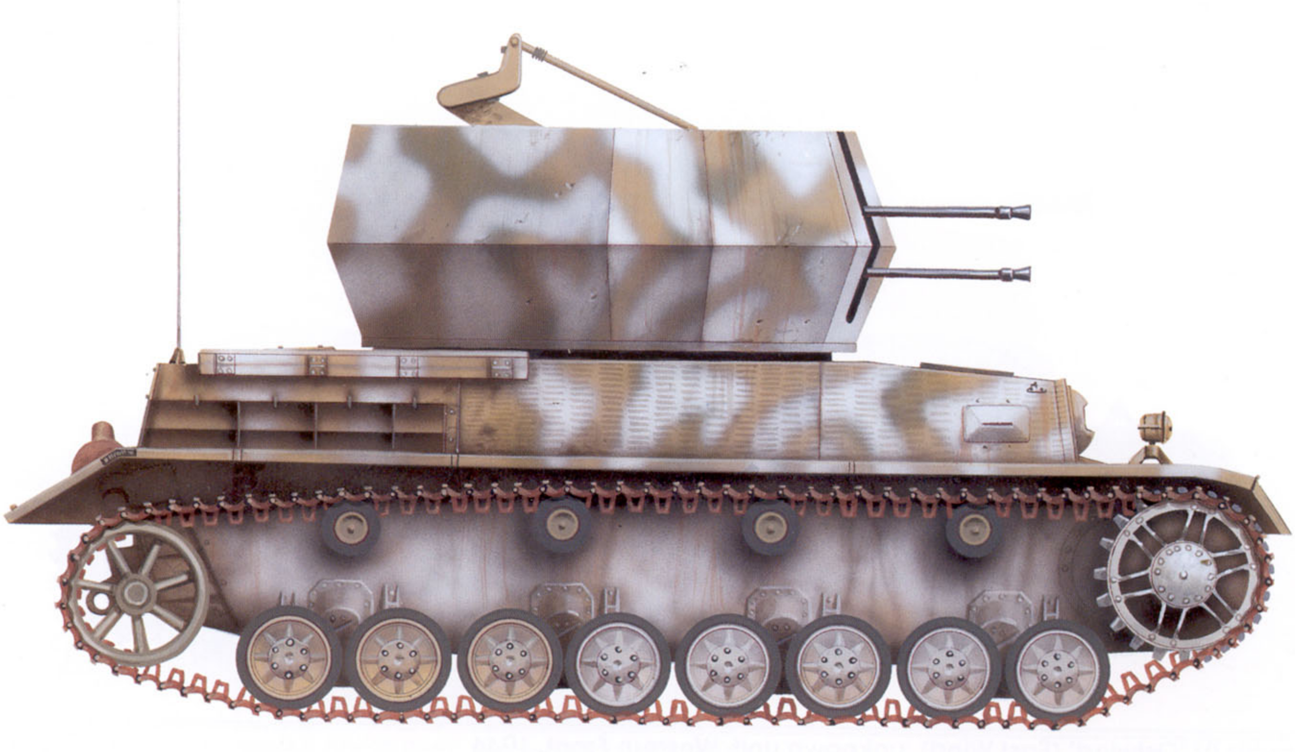
**Flakpanzer IV 'Ostwind' (East Wind), unknown unit, Western Front, 1944**

The 'Ostwind' mounted a 3.7cm FlaK 43 on refurbished battle-damaged Pz.Kpfw.IV Ausf.F or G chassis. An effective pattern of dark olive green (RAL 6003) highlighted with red brown (RAL 8017) has been painted over the dark yellow (RAL 7028) base. After successful trials, the prototype was sent into action on the Western Front in late September 1944. Approximately 40 vehicles were built and photographs of them in action are extremely rare.



**Sd.Kfz.7/1, FlaK-Regiment, Panzer-Korps "Großdeutschland," East Prussia, January 1945**

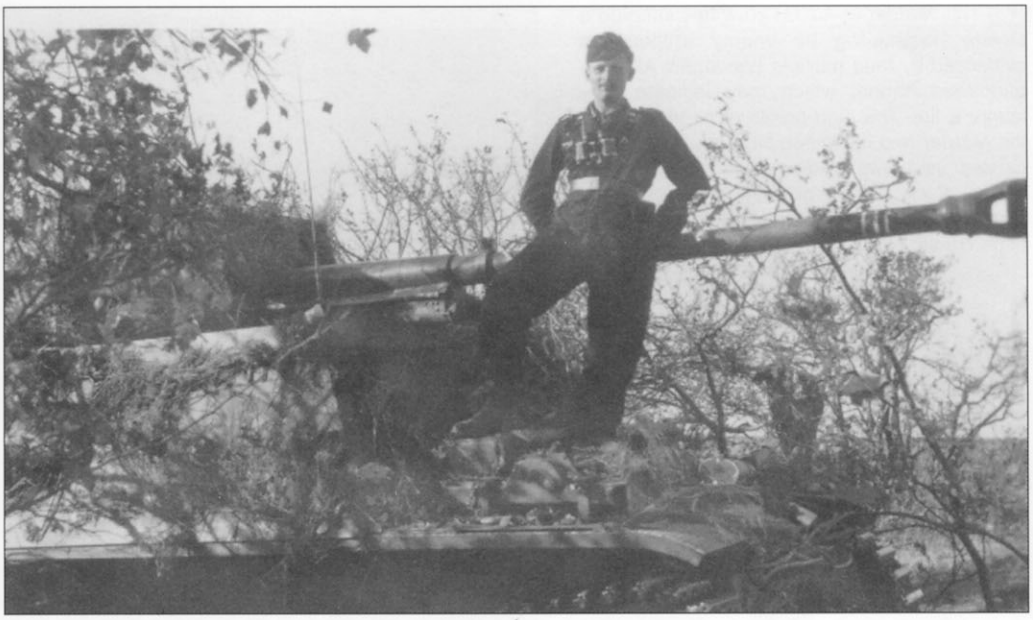
This is a late production vehicle with the lightly armored cab and engine compartment. The 8-tonne half-track has been whitewashed and some of its dark yellow (RAL 7028) base can be seen through the wear.

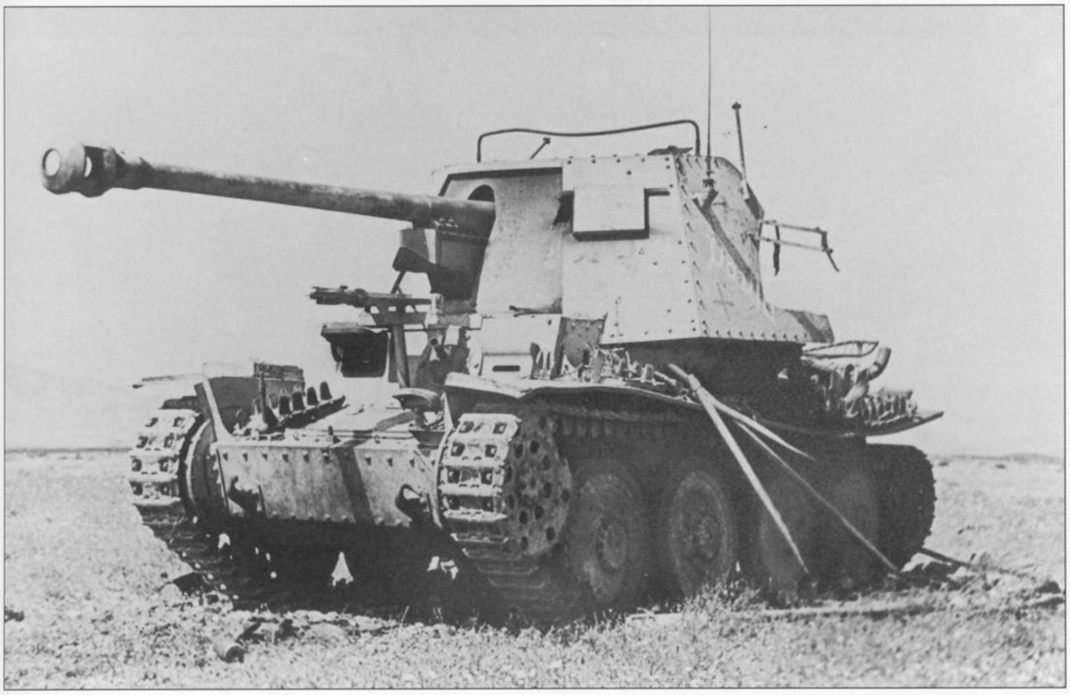


**Flakpanzer IV 'Wirbelwind' (Whirlwind), unknown Panzer-Division, January 1945**

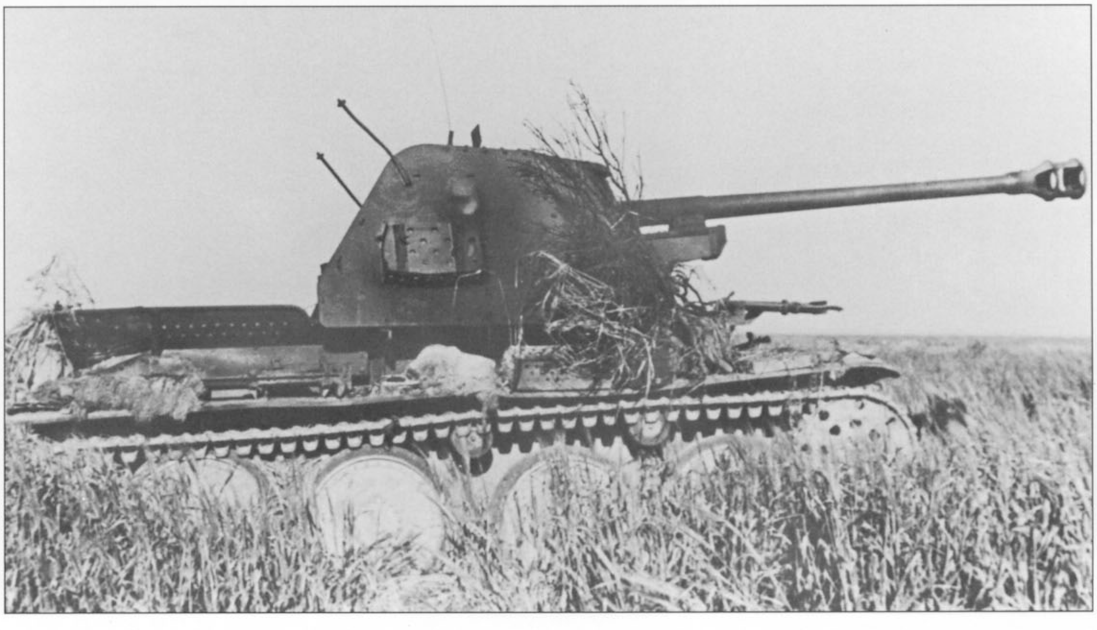
White bands and splotches have been sprayed over the standard three color camouflage scheme of dark yellow (RAL 7028), olive green (RAL 6003) and red brown (RAL 8017). No other markings are visible.

This Marder II (Sd.Kfz.132) crewman displays the black panzer uniform worn by self-propelled antitank battalions. Like tank troops they wore pink arm of service piping on the rank shoulder straps, collar and collar patch edging, and as a chevron on their field cap. Black was ill-suited for antitank and assault gun crews. They were often required to dismount and scout routes and positions and the black uniform was far too conspicuous. Many units were later issued field gray uniforms of the same cut as the black. The vehicle is camouflaged by both foliage fastened to wire and by simply stacking it up loose around the vehicle.



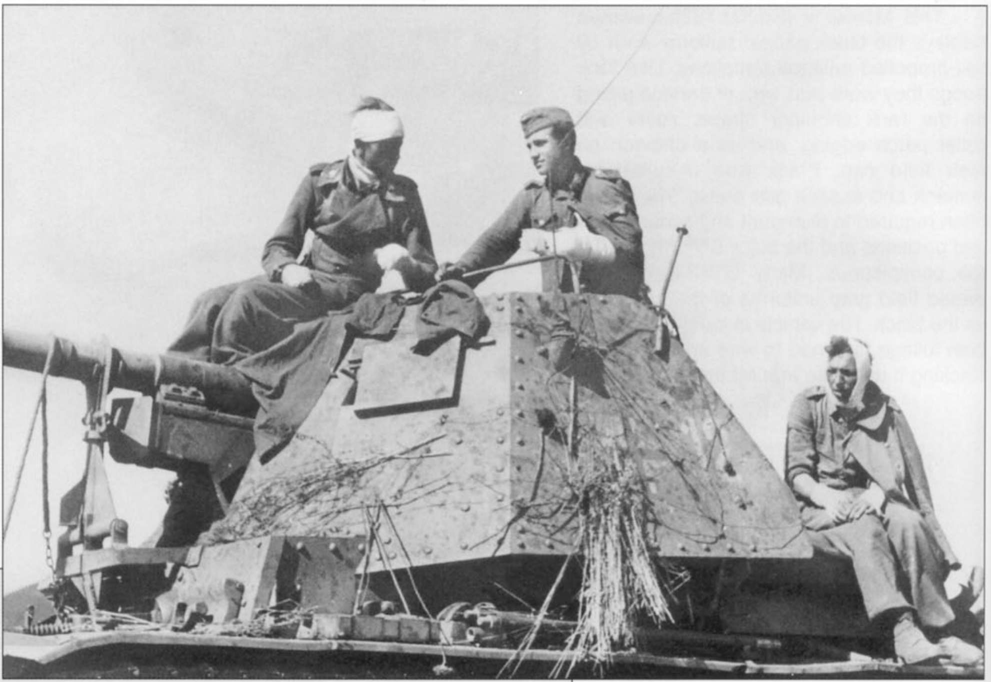


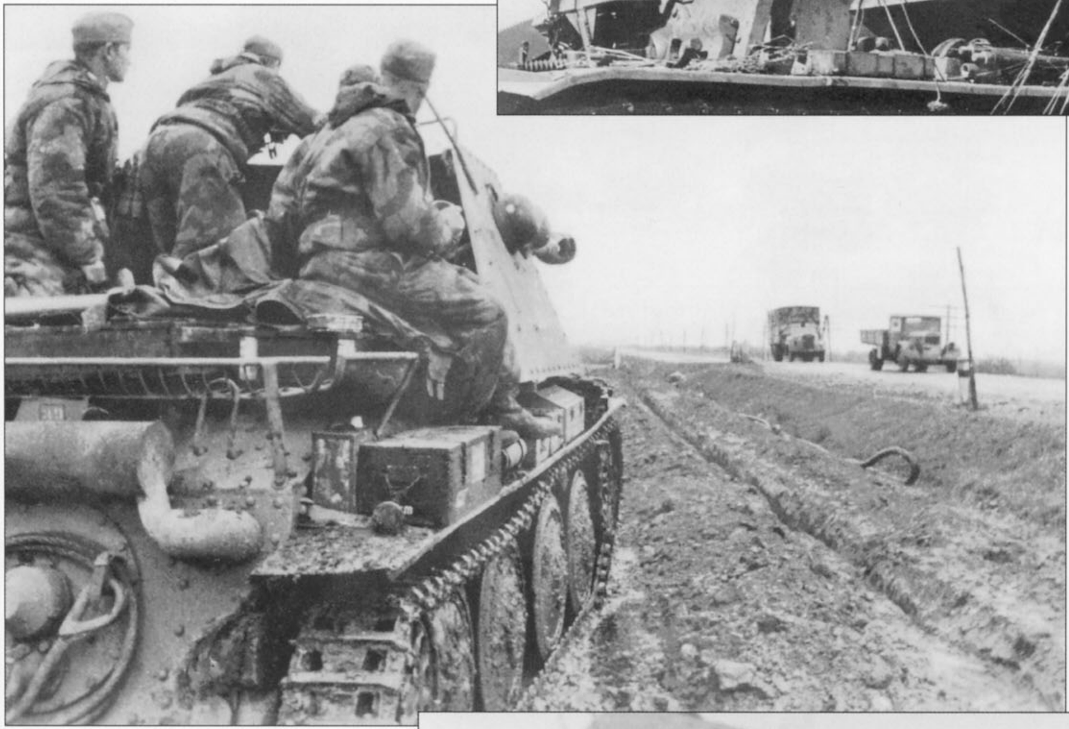
The 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Ausf.H variant of the Marder III (Sd.Kfz.138), was built on a Czechoslovak vz.38 light tank chassis, the Pz.Kpfw.38(t). There were considerable differences between the Ausf.H and M. Both had an open-top compartment, but the Ausf.H was open in the rear. The Ausf.H carried 38 rounds of 7.5cm ammunition and the gun had a 30-degree left and right traverse. Its armor was 8-50mm thick. Between late 1942 and mid-1943, 418 Ausf.H's were built and employed on all fronts with the first being assigned to Panzerjäger-Abteilungen in May 1943. This particular Marder III, inscribed with "Paula" in white over a faint Balkenkreuz, had a large piece of the gun compartment's left side plating was blown off by a direct hit.



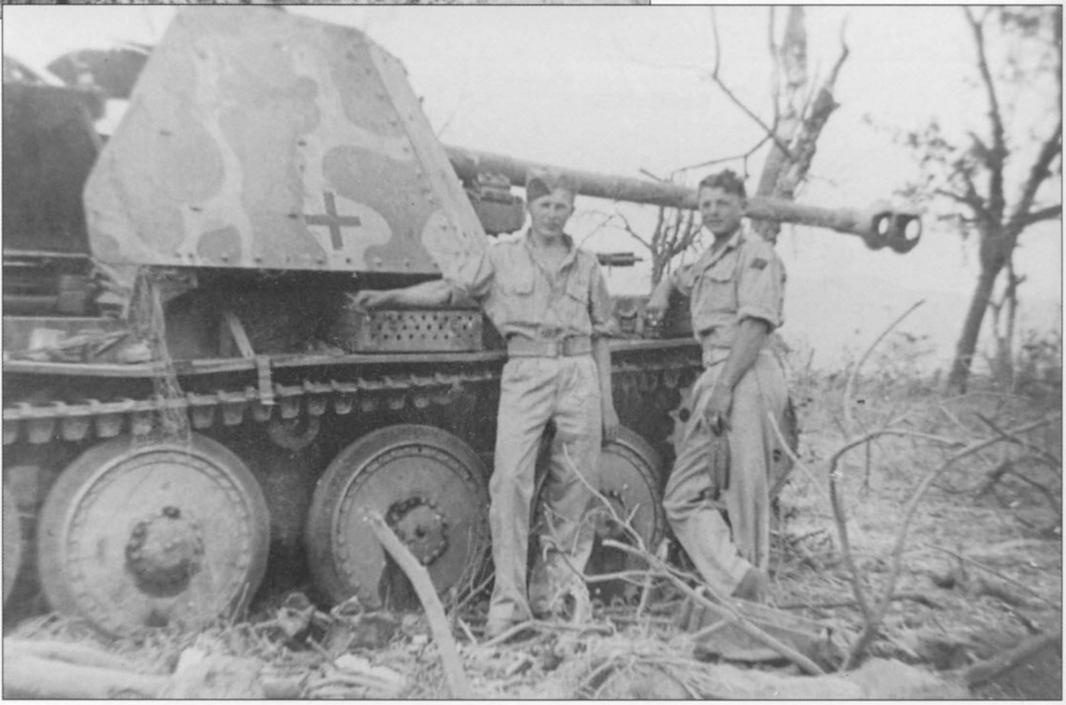
The right profile of a 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Marder III Ausf.H. The horizontal apparatus below the gun barrel is the barrel lock lowered for firing. Beneath it can be seen the barrel of the 7.92mm MG-37(t) (Czechoslovak vz.37) machine gun mounted in the center of the bow compartment. It did not carry an MG-34 machine gun internally in the gun compartment as did the Ausf.M.

This Marder III Ausf.H crew has suffered a severe hammering by enemy artillery as evidenced by their multiple bandages. All have bandaged hands, which may indicate they fought a fire. The high profile of all versions of the Marder and its limited side and rear armor caused its crews a great deal of grief. The 50mm thick armor protecting the driver's compartment is apparent along with the riveted plate construction. This vehicle is identified as "12" in either white or dark yellow.



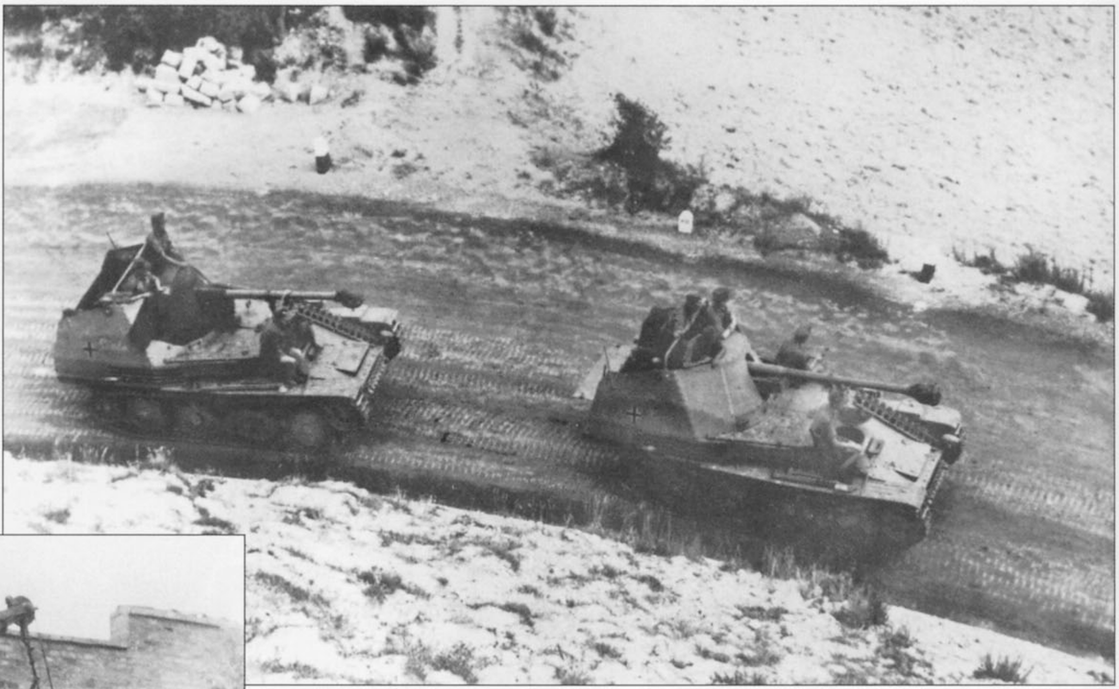


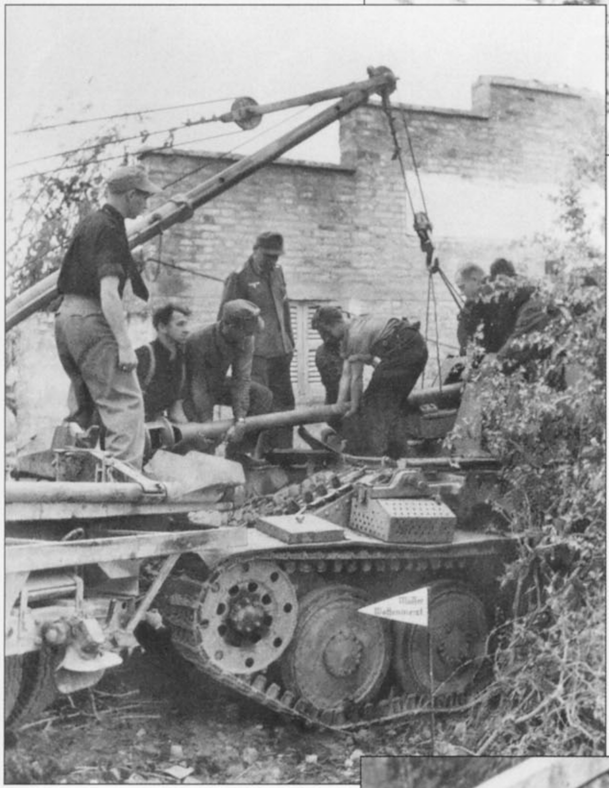
A 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Marder III Ausf.H covers a supply road in Shitomir, December 1943. The many tool and spare parts boxes are obvious over the track guard. The crew wears camouflage insulated winter uniforms. Their helmets are slung on the side of the superstructure, a common practice.



Two Canadian soldiers examine a 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Marder III Ausf.H in Italy, May 1944. The camouflage colors appear to be green patches and red brown on a dark yellow base. The open rear gun compartment of the Ausf.H and its comparatively short side armor provided less protection than the Ausf.M.

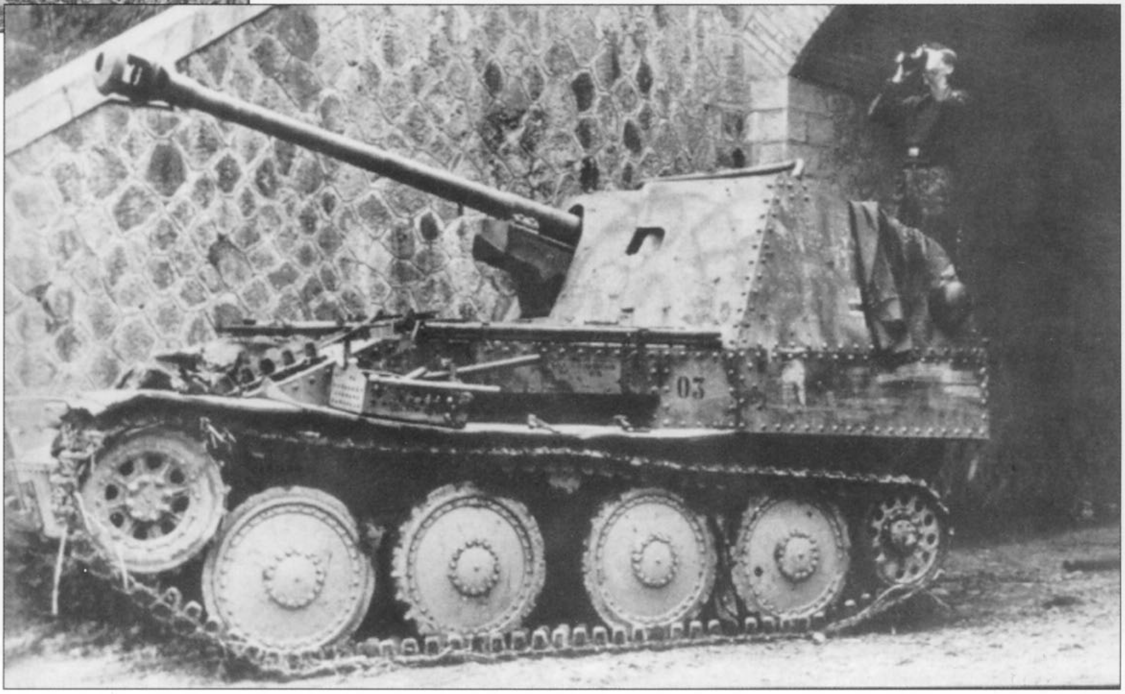
Two Marder III Ausf.M roll down a road through snow-dusted countryside in northern Italy. It was common for one or two crewmen to ride on the forward portion of the vehicle to watch for hazards and to dismount and serve as ground guides when crossing difficult ground or when among foot troops to prevent accidents. Too faint to make out, the following vehicle has a name inscribed on the side of the superstructure.

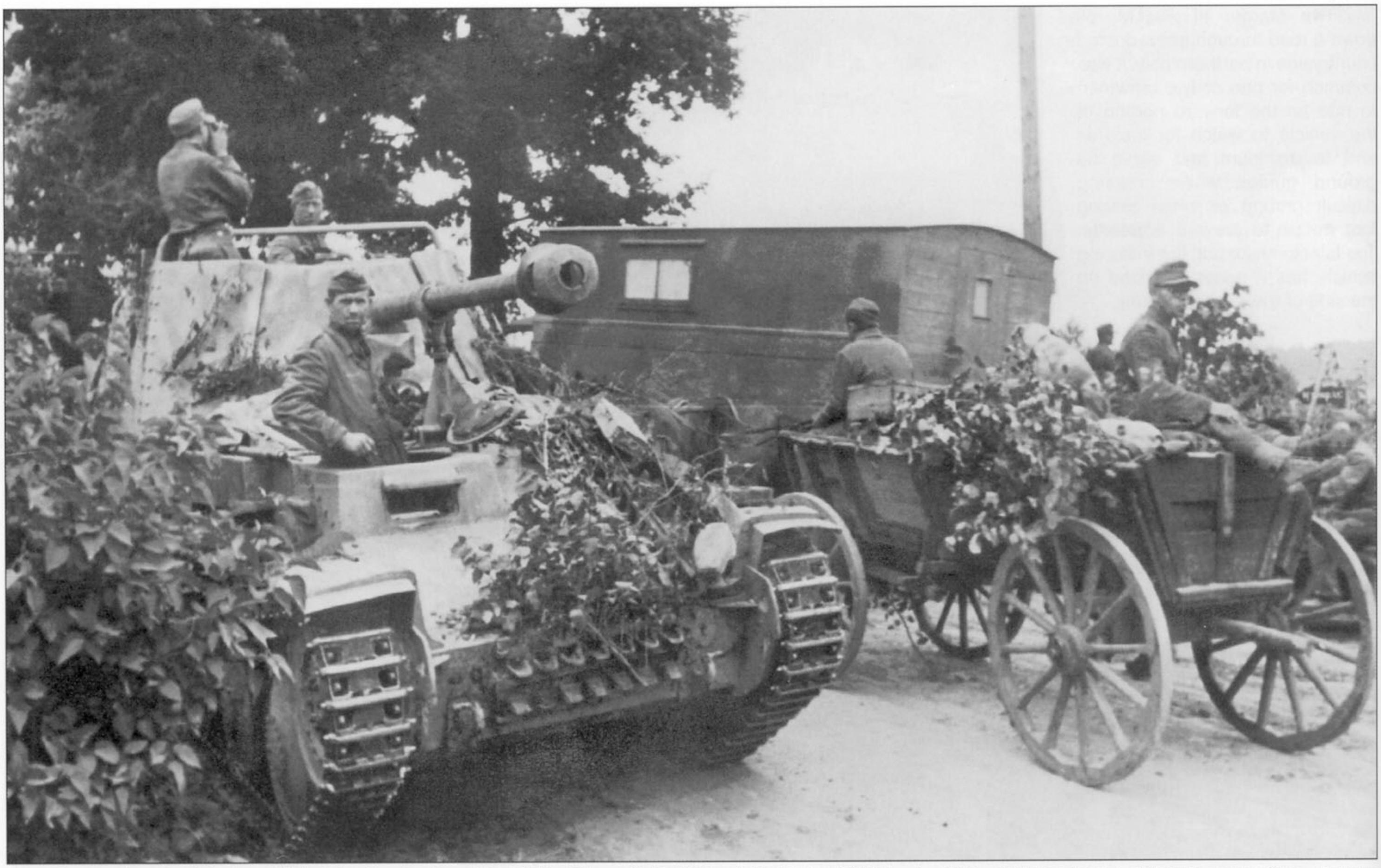




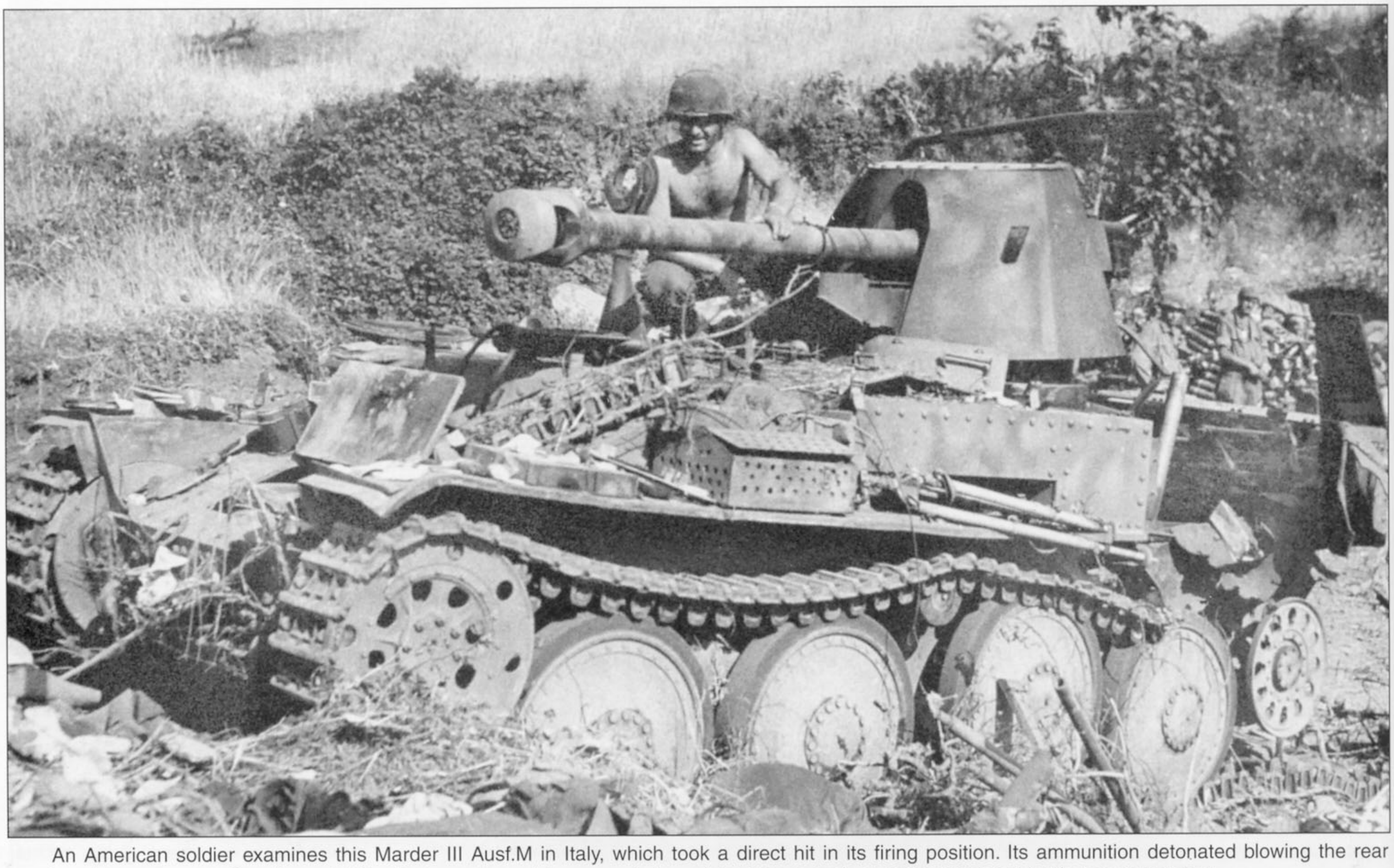
The crew of a Marder III Ausf.M assists with dismounting the 7.5cm gun from the vehicle with the aid of a crane. The barrel life of the PaK 40 was only some 1,000 rounds and barrels were used up at an alarming rate. A track jack is secured to the perforated tool box on the track guard. The white on black metal pennant-shaped sign reads "Müller Waffenmeist."[er] in Gothic script. Weapon Master Müller was the NCO armorer in charge of the workshop.

A gun commander of this 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Marder III Ausf.M (Sd.Kfz.138) scans a mountainside in Italy for enemy activity. The gun is positioned to withdraw into a road tunnel in the event enemy aircraft appear. The camouflage pattern is haphazardly sprayed olive green on dark yellow. Marder company headquarters did not possess its own Marders, but in some instances units would organize, as they felt necessary. The black "03" on the upper hull side may indicate a company headquarters vehicle. This vehicle has seen many kilometers of hard travel as exhibited by the excessively chewed up rubber rims of the road wheels. It also demonstrates that replacement parts were often scarce.

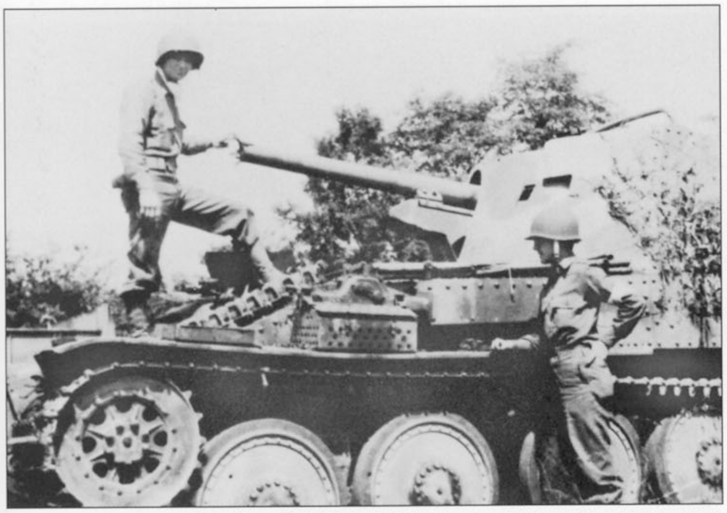




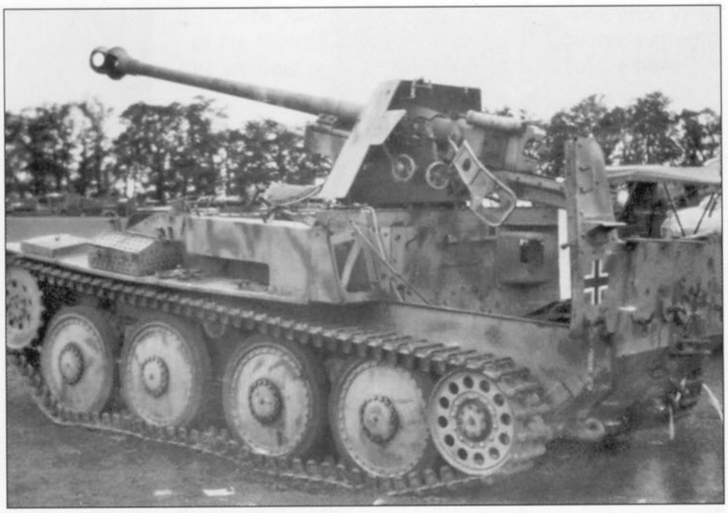
The modern beside the old, Latvia, September 1944. This 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Marder III Ausf.M has had a splotchy camouflage pattern sprayed over the dark yellow base. Vegetation attached to vehicles, even a small amount, helped breakup their outline when they pulled into roadside foliage upon the approach of enemy aircraft. Beside the Marder III is an Hf.1 light field wagon, 3.86 meters long.



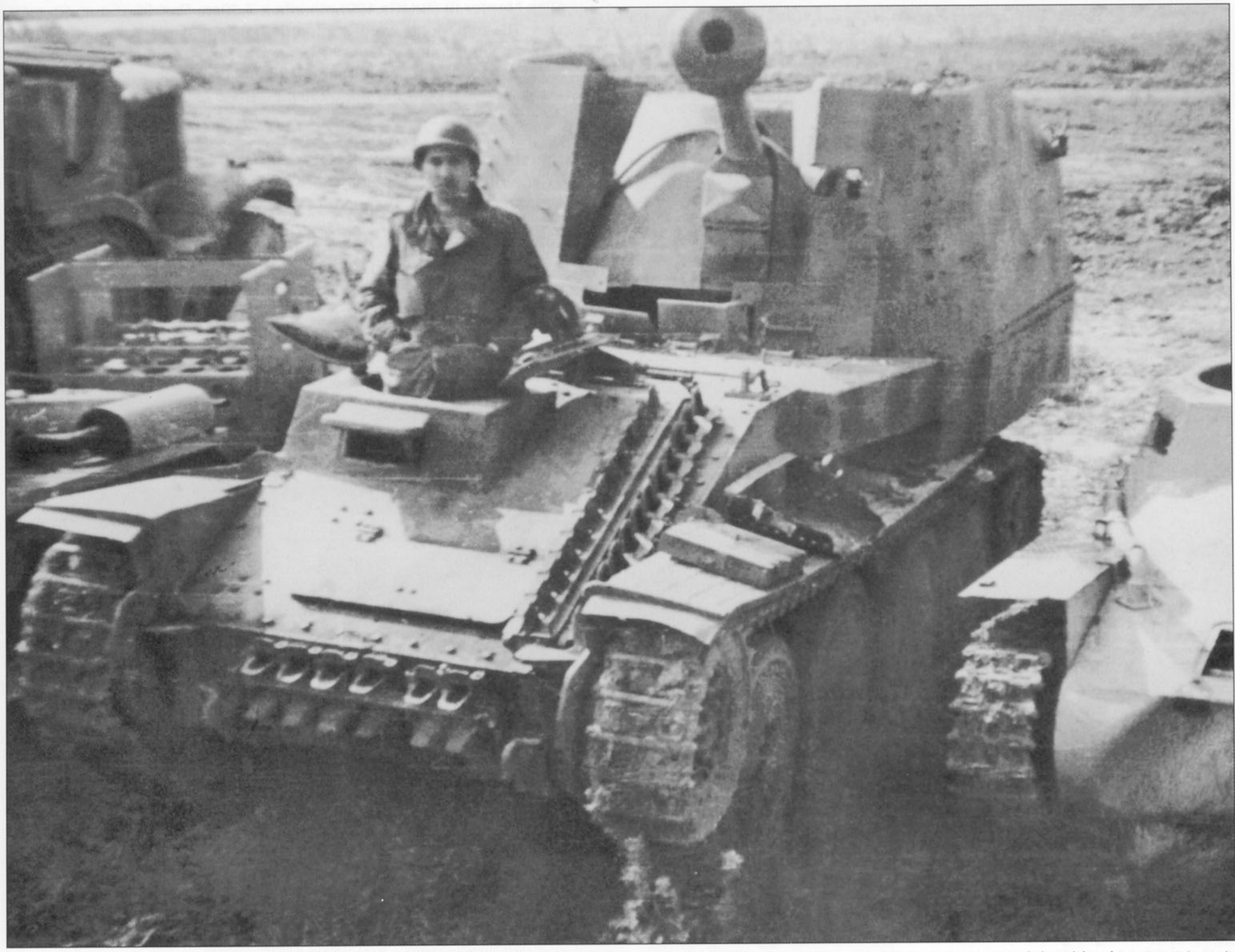
An American soldier examines this Marder III Ausf.M in Italy, which took a direct hit in its firing position. Its ammunition detonated blowing the rear overhanging gun compartment apart. This photograph provides a good view of the 7.5cm gun's shield unhindered by the superstructure.



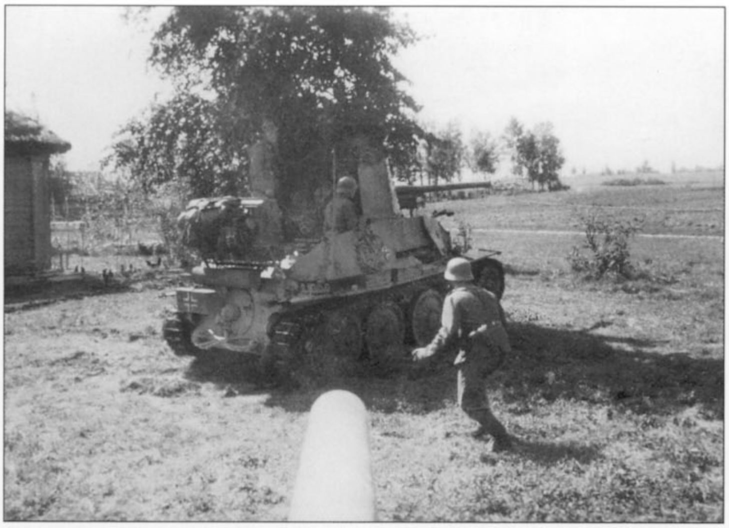
The 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Marder III Ausf.M (Sd.Kfz.138) was built on a much-modified Czechoslovak vz.38 light tank chassis. The engine relocation allowed the gun compartment to be positioned in the rear to provide a more efficient crew accommodation though the gun could only traverse 21 degrees left and right. The hull front and driver's compartment was much different too than the Ausf.H's. The armor was lighter though, 8-20mm, but the frontal glacis was very well sloped. It carried less ammunition than the Ausf.H, only 27 rounds. A total of 975 Ausf.Ms were produced. This one's gun barrel had been burst, probably by the capturing Americans to prevent its reuse.



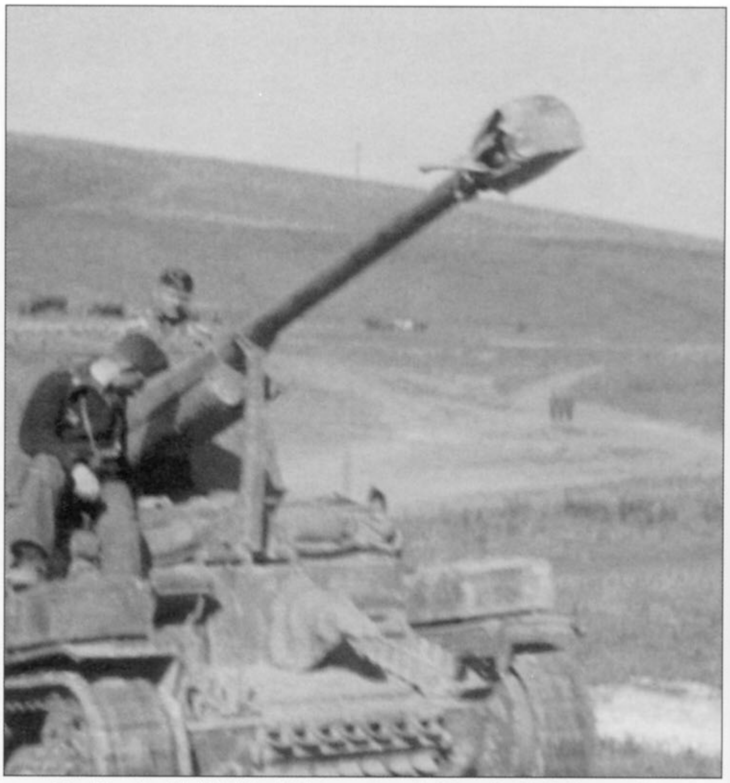
This Marder III Ausf.M has had its side and rear panels blown off revealing the 7.5cm PaK 40/3. The gun's breech guard is bent downward. Note the small Balkenkreuz on the rear hull. The camouflage pattern consists of crude spray-painted bands on the dark yellow base. This vehicle was captured in Germany in 1945.



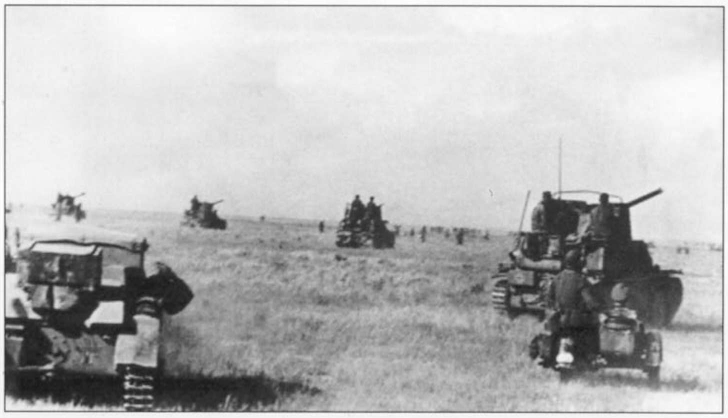
A 7.5cm PaK 40/3 auf Pz.Kpfw.38(t) Marder III Ausf.M with the late production hull identified by the welded flat plates around the driver's compartment. Early production vehicles has a rounded cast driver's compartment. The positioning of the track sections on the upper and lower glacis was standard.



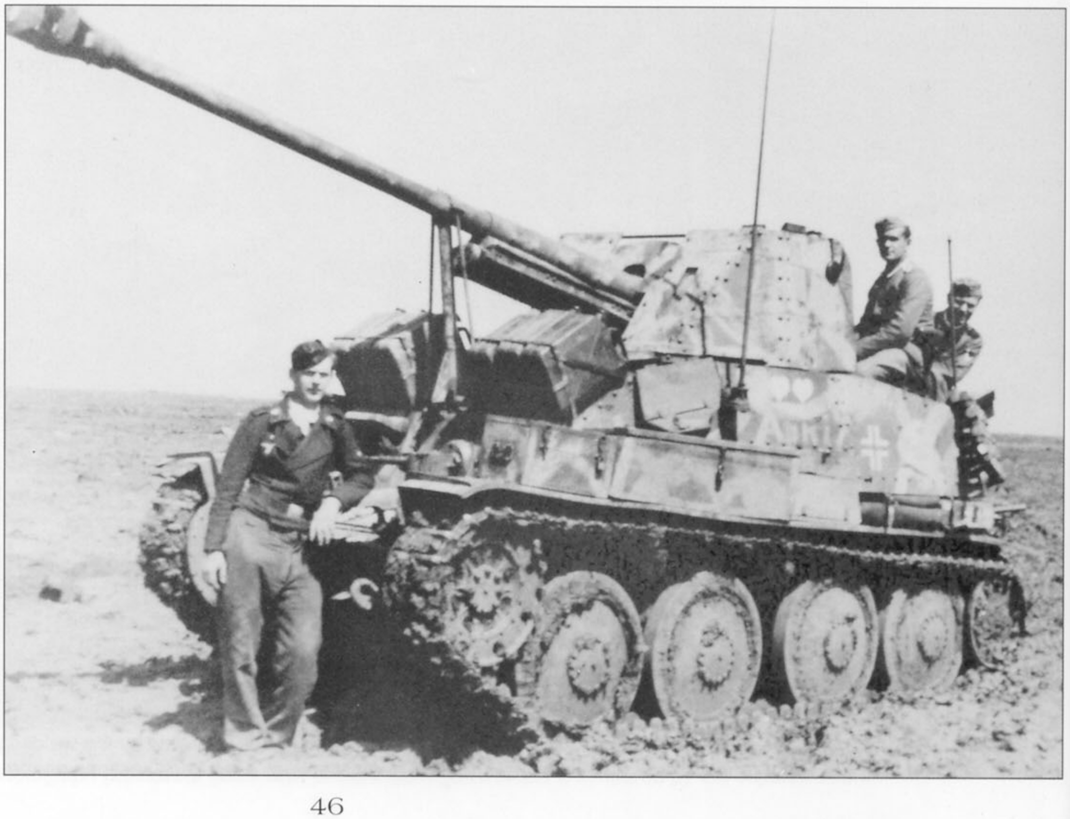
Another type of Marder III, of much different design than the Sd.Kfz.138, was the Sd.Kfz.139, the Panzerjäger 38(t) für 7.62cm PaK 36(r). Both were built on Pz.Kpfw.38(t) chassis, but the superstructures were much different. The Sd.Kfz.139, in similar concept to the Sd.Kfz.132 Marder II had its gun mounted atop the superstructure. This Marder III (Sd.Kfz.139) is in action in Russia, August 1942. A storage rack was fitted in the rear. Note the small Balkenkreuzen on the superstructure sides and rear storage box. They equipped both separate and Panzer division Panzerjäger-Abteilungen.



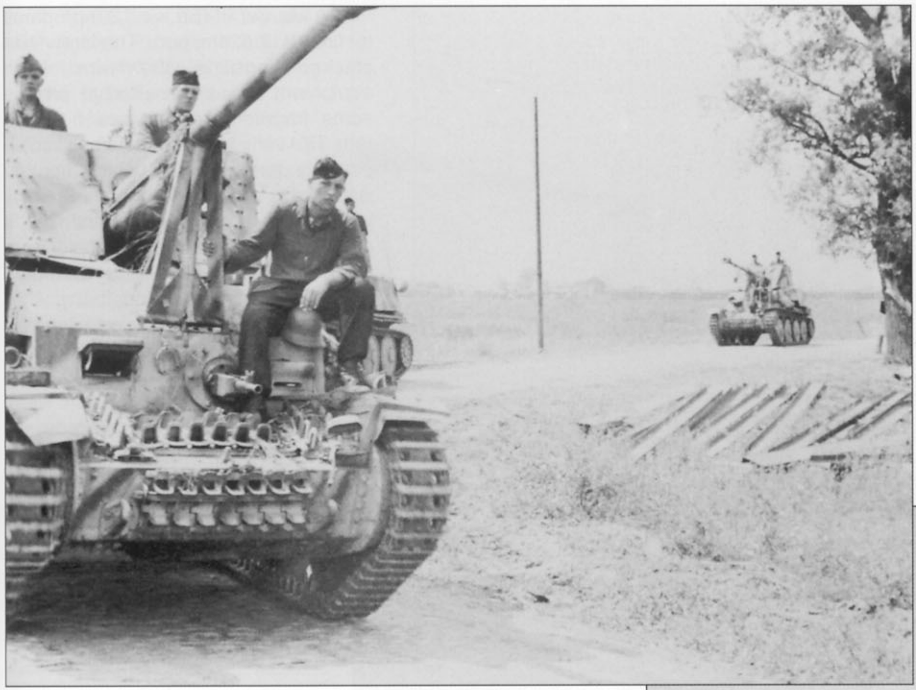
The Marder III (Sd.Kfz.139) mounts a 7.62cm PaK 36(r) gun. So many Russian 76.2mm guns were captured that it became one of the most numerous antitank guns in German service in both towed and self-propelled mountings. It could punch through 120mm of armor with the German-produced tungsten-cored armor-piercing rounds at 500 meters.



A line of Marder III's (Sd.Kfz.139) advance across a Russian steppe covering advancing infantrymen on foot ahead of them. For an inexplicable reason the 7.62cm gun muzzle brakes on the original photograph have been obscured. A company officer rides in a combination motorcycle to maintain contact with the Marders and report events to the company headquarters. To the left is a Munitionsschlepper I Ausf.A (Sd.Kfz.111) ammunition carrier with a buller hole in the fender.

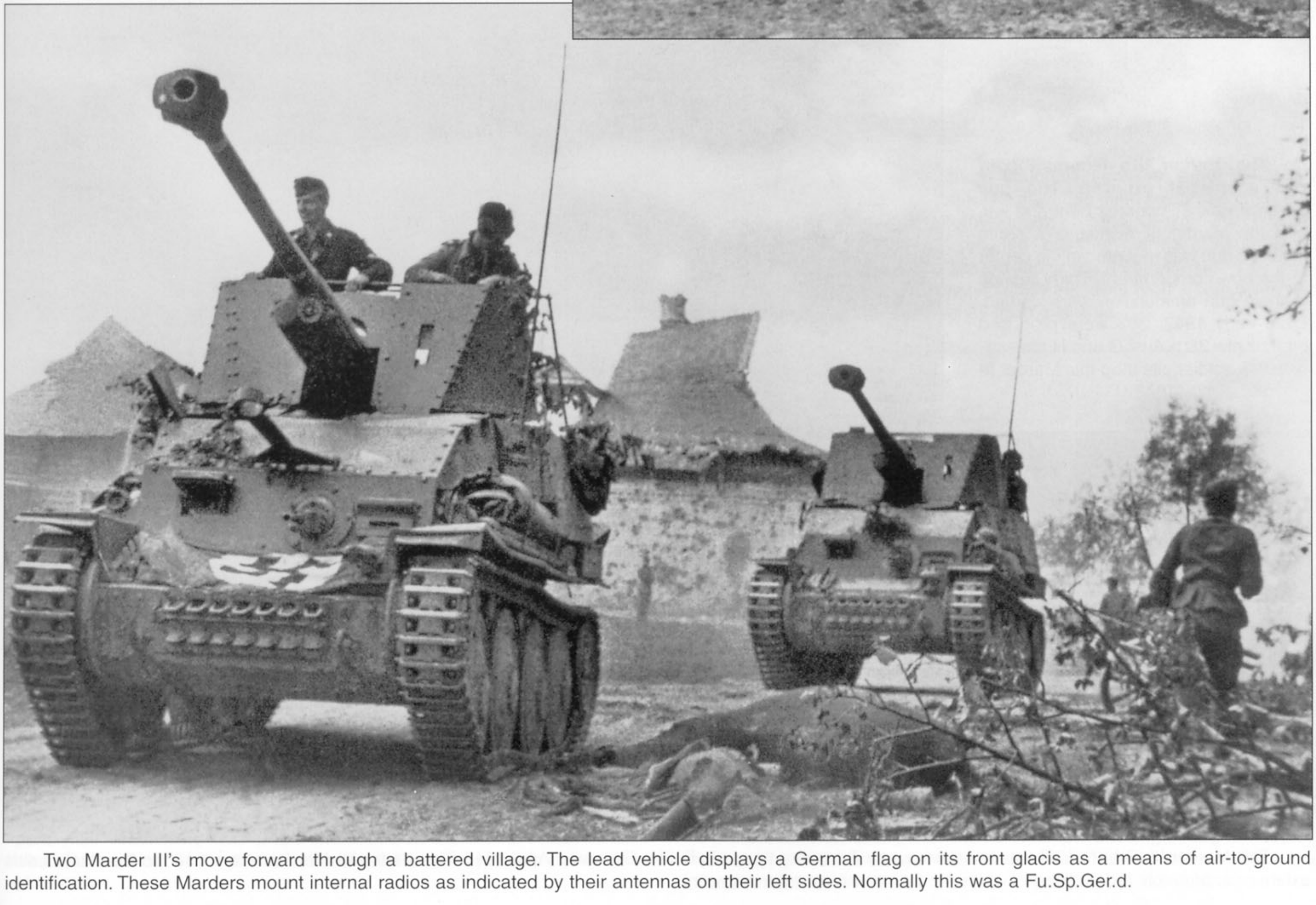


The superstructure of this Marder III (Sd.Kfz.139) features the battalion insignia. Note the six 20-liter fuel cans fastened on the forward hull. Used for long movements, these would be discarded when going into combat and probably dropped off at a battalion dump.

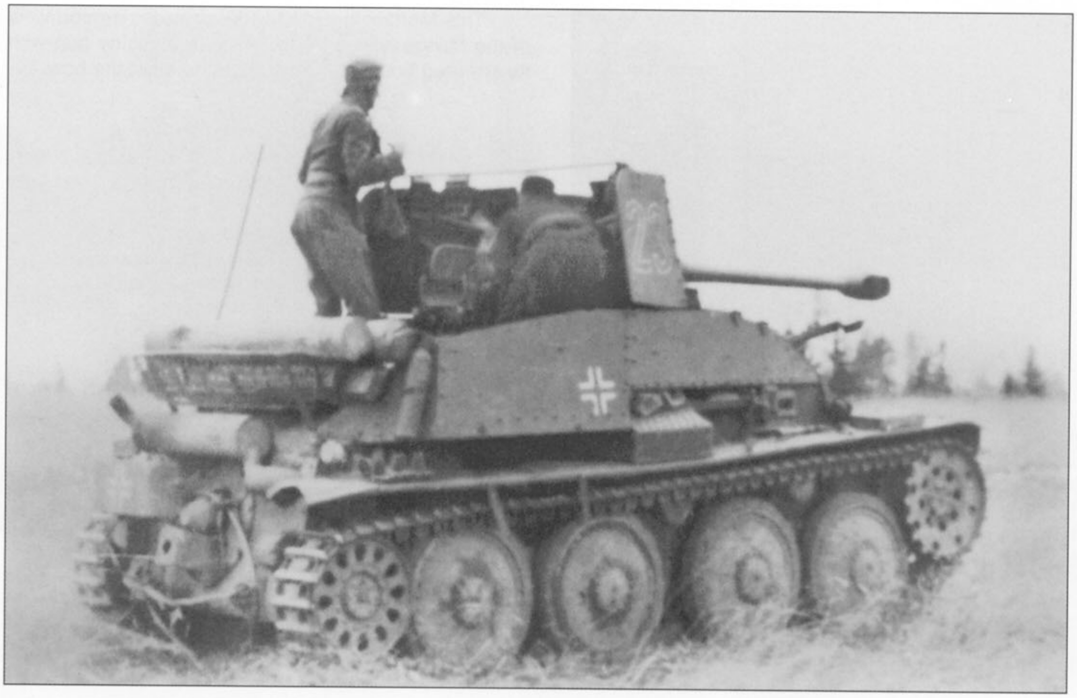


This Marder III (Sd.Kfz.139) provides a good view of the fittings, vision ports, 7.92mm machine gun with its armored housing, and other features of the bow.

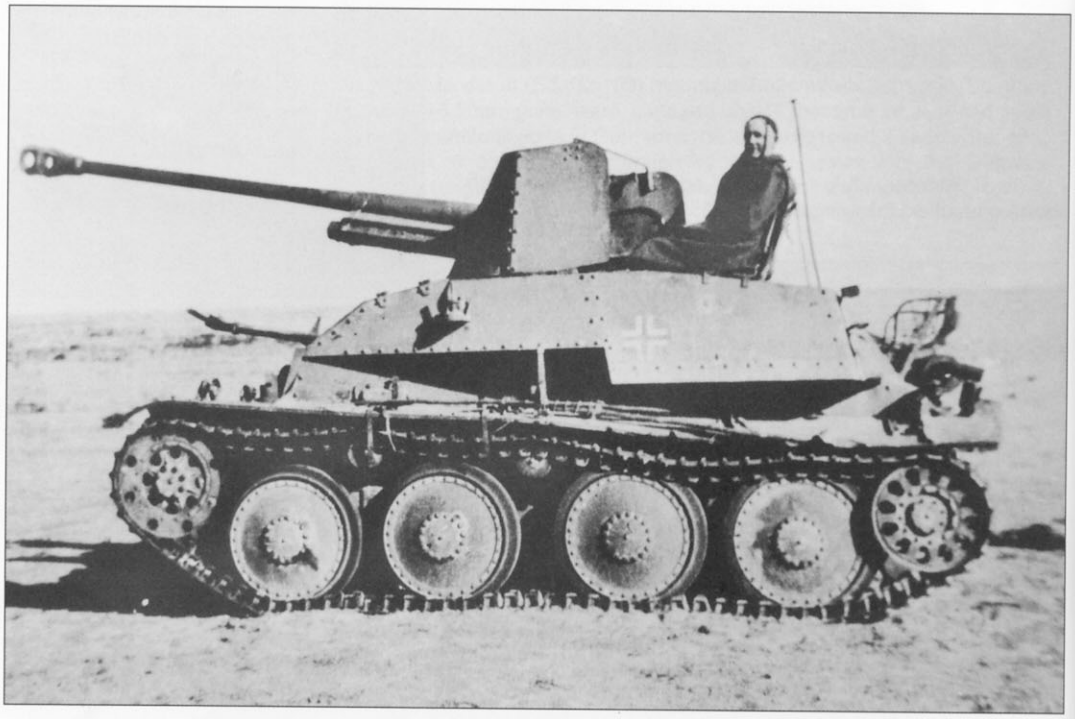
Two Marder III's charge across a field with Panzergrenadiers following in Sd.Kfz.251/1 half-tracks.



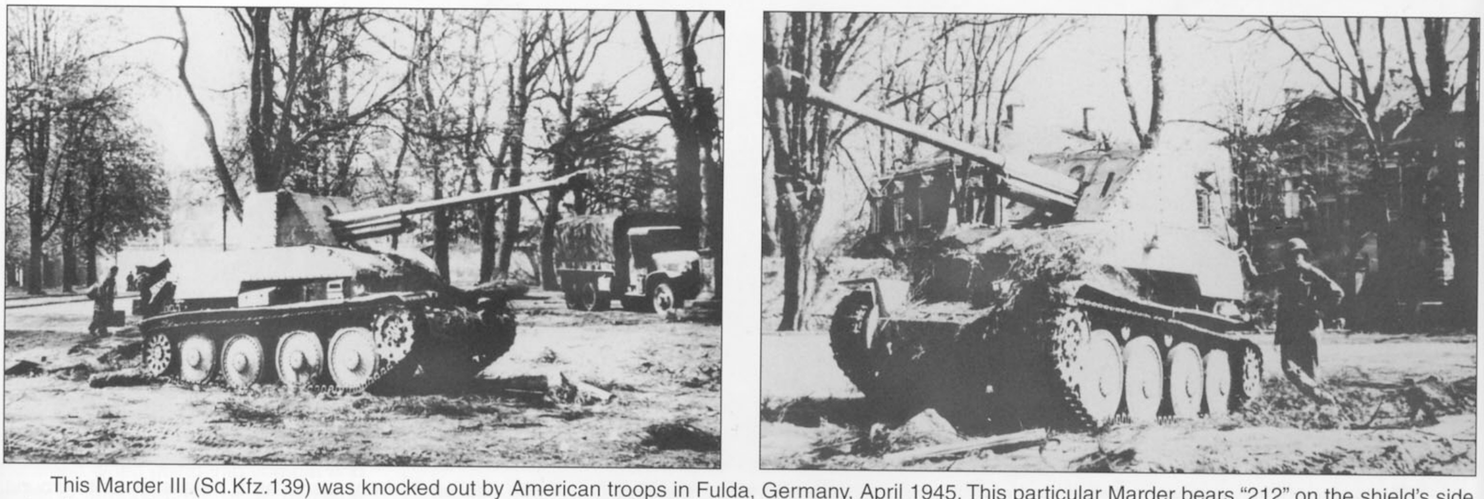
Two Marder III's move forward through a battered village. The lead vehicle displays a German flag on its front glacis as a means of air-to-ground identification. These Marders mount internal radios as indicated by their antennas on their left sides. Normally this was a Fu.Sp.Ger.d.



A Marder III (Sd.Kfz.139) prepares to fire its 7.62cm gun. The crew has stacked logs in the wire mesh equipment rack in an effort to provide some fragmentation protection to the rear. The vehicle is painted a solid color, possibly dark gray. The vehicle number is probably red outlined in white. Many units used two-digit numbers, but it appears that three-digit numbers were more common. Two-digit numbers identified the gun and company while three-digit numbers, as used by tank units, identified the gun, platoon, and company.

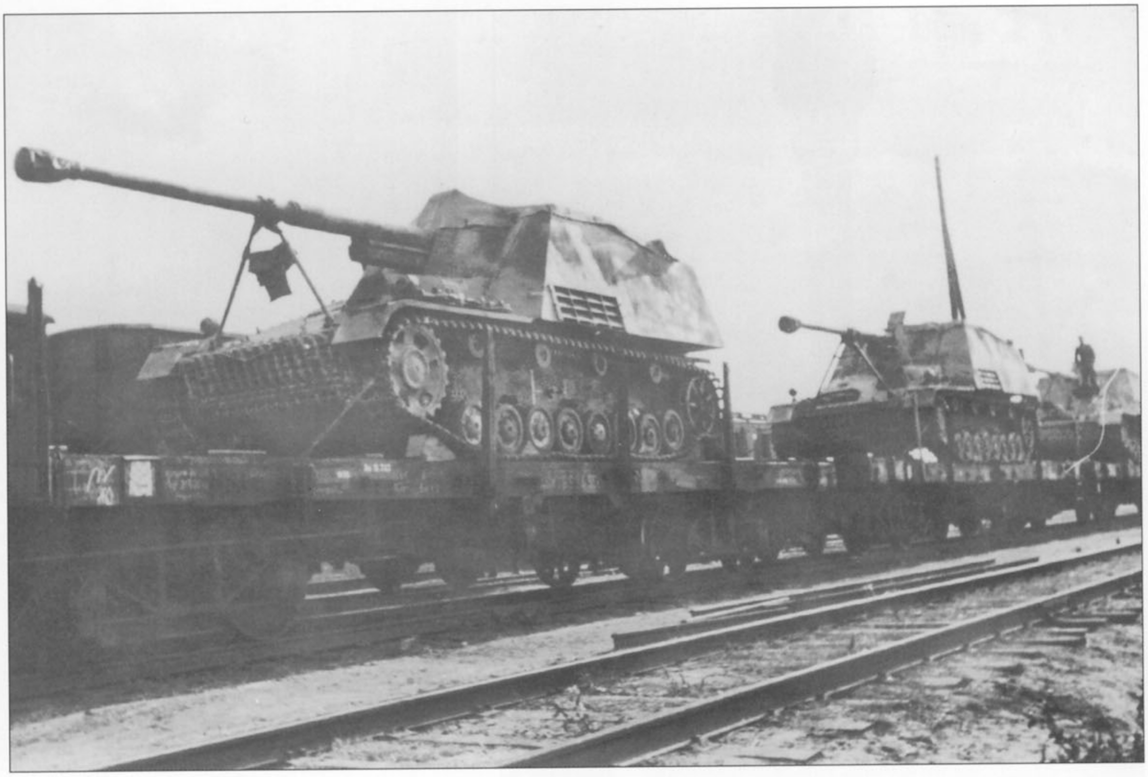


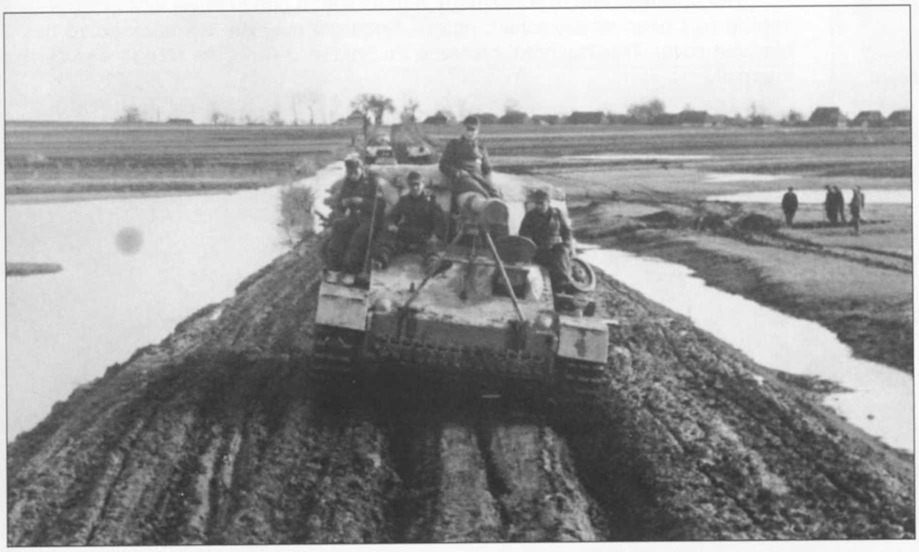
The Marder III's four-man crew was somewhat exposed. The gun traverse was 21 degrees right and left. Like the Marder III Ausf.H, a 7.92mm machine gun was mounted in the center of the bow compartment. Thirty rounds of main gun ammunition were carried. From early 1942, 363 were produced on Pz.Kpfw.38(t) Ausf.G and H chassis. A British soldier sits atop this Marder III in North Africa, 1943.



This Marder III (Sd.Kfz.139) was knocked out by American troops in Fulda, Germany, April 1945. This particular Marder bears "212" on the shield's side extensions, probably red outlined in white. No Balkenkreuzen are apparent.

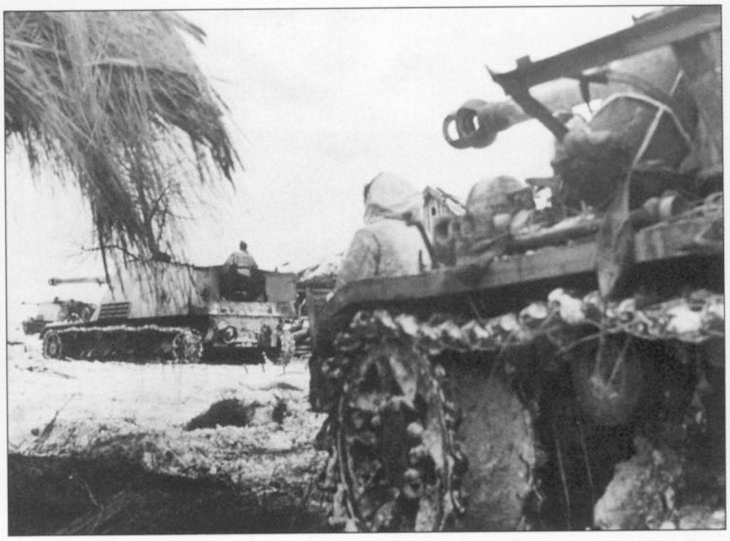
The 8.8cm PaK 43/1 auf Fahrgestell Pz.Kpfw.III und IV (Sd.Kfz.164), was built on the same hybrid chassis as the 15cm 'Hummel' howitzer. When introduced in the spring of 1943 it was known as the 'Hornisse' (Hornet) and later as the 'Nashorn' (Rhinoceros), of which 494 were built. This was the first attempt to mount an 8.8cm antitank gun on a self-propelled mount. This 'Nashorn' unit is embarked aboard heavy-duty flatcars for movement to a new front. It was common for combat depleted formations to be withdrawn from the front, re-equipped, re-manned, and re-trained and then deployed by rail to a new front.



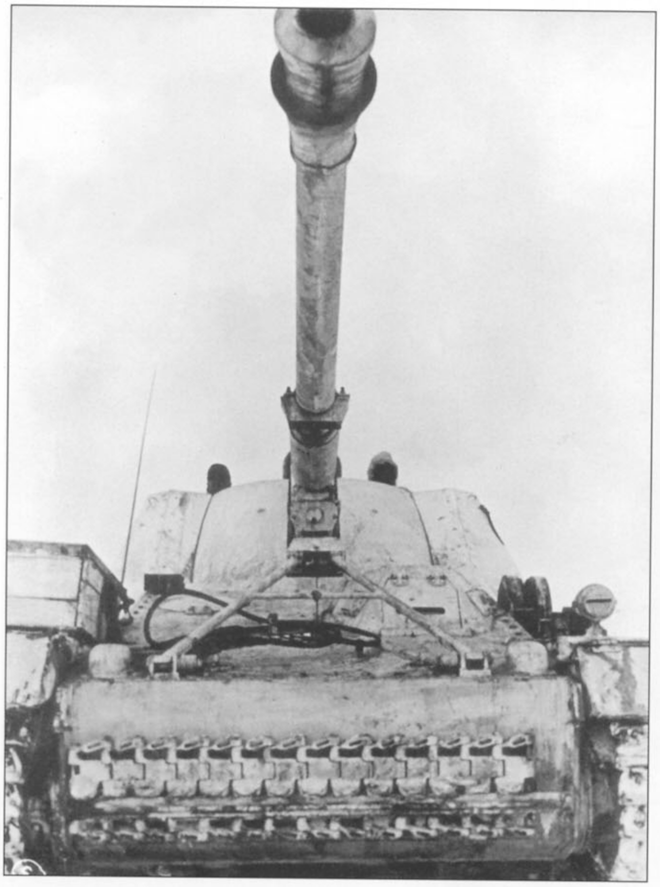


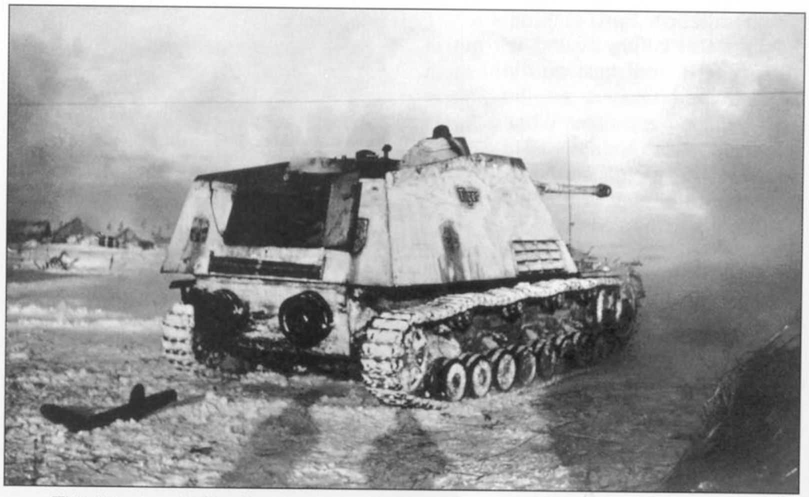
A 'Nashorn' struggles across an extremely muddy elevated road. The crew had fitted its canvas cover over the gun compartment. In the background Russian peasants, detailed by the Germans, attempt to determine how to repair the damage caused by other vehicles trying to cross the lower ground with the limited hand tools they have available.

While providing only light armor, possessing a high profile, and was overweight resulting in marginal cross-country mobility, the 'Nashorn' performed reasonably well when introduced at the battle of Kursk. This whitewashed 'Nashorn' is positioned beside a Russian log cabin in the winter of 1943/44.



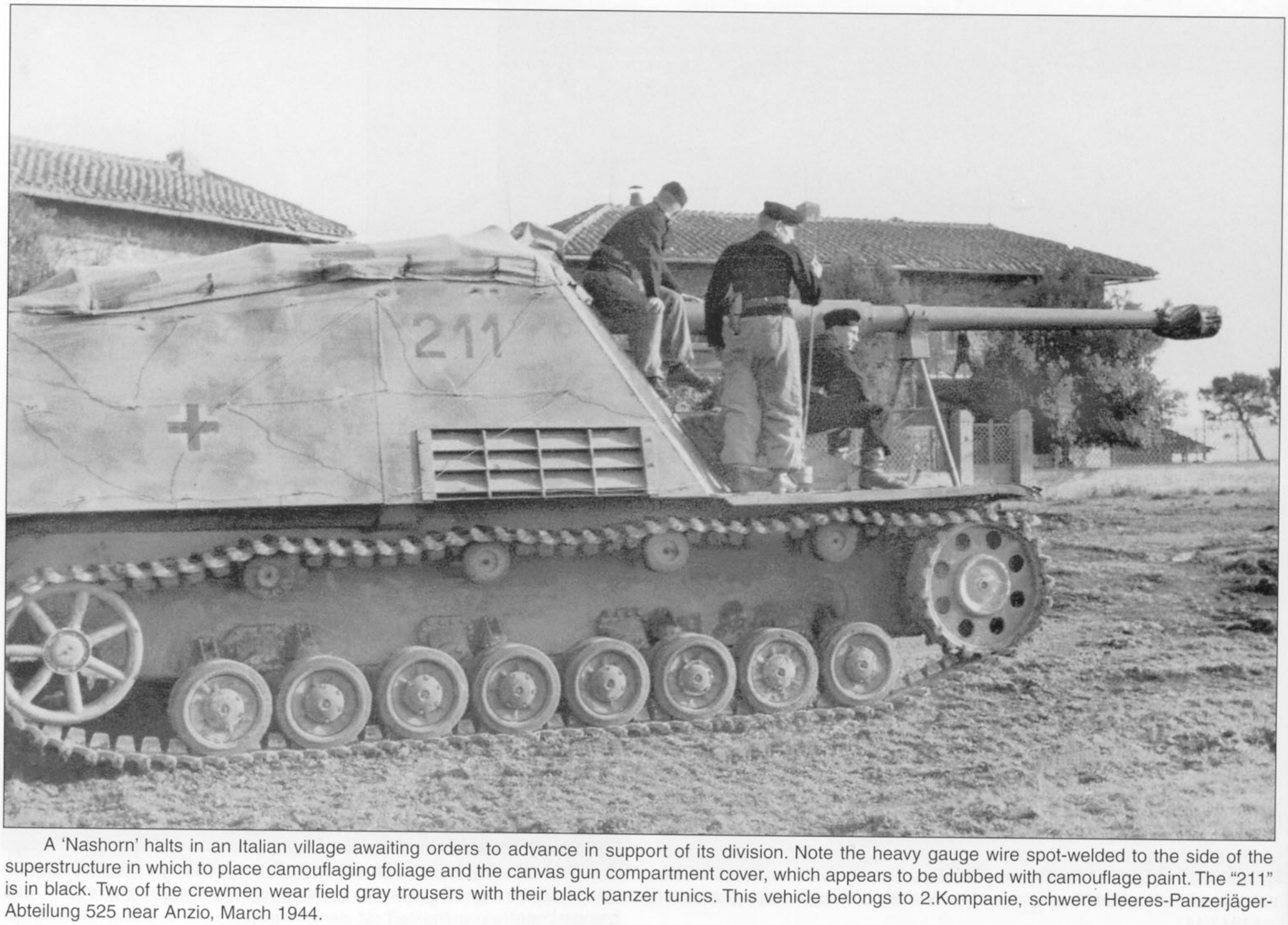
The rear view of a whitewashed 'Nashorn' passing through a Russian village. This view displays the double rear opening doors of the gun compartment.



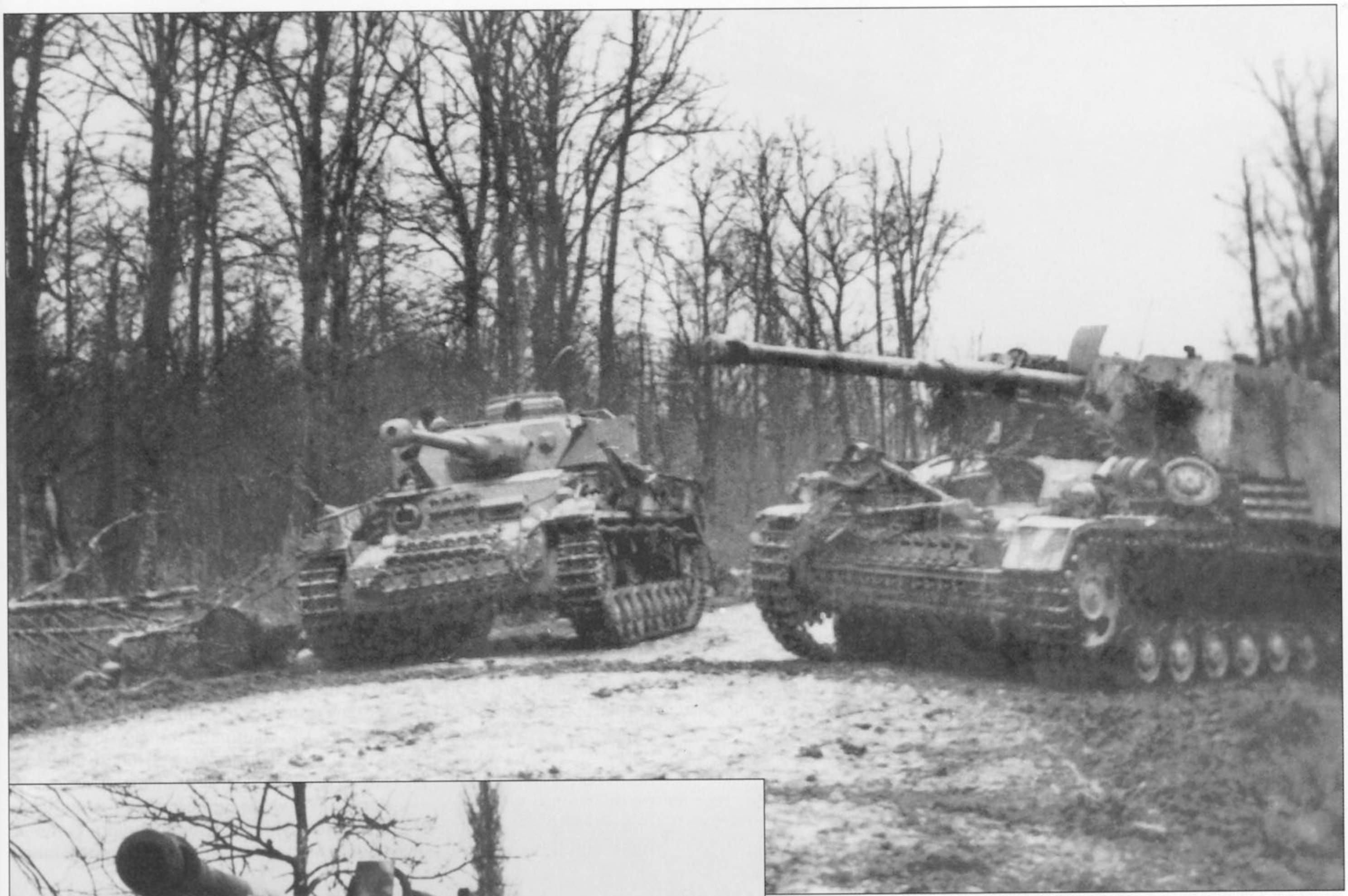


This 'Nashorn', blasting enemy positions, had been whitewashed with the crew taking care not to obscure the Balkenkreuz on the side and rear, a unit insignia on the right rear party covered by a door, and their vehicle's nickname, "Tiger." The latter appears to be black-outlined on the vehicle's dark yellow base.

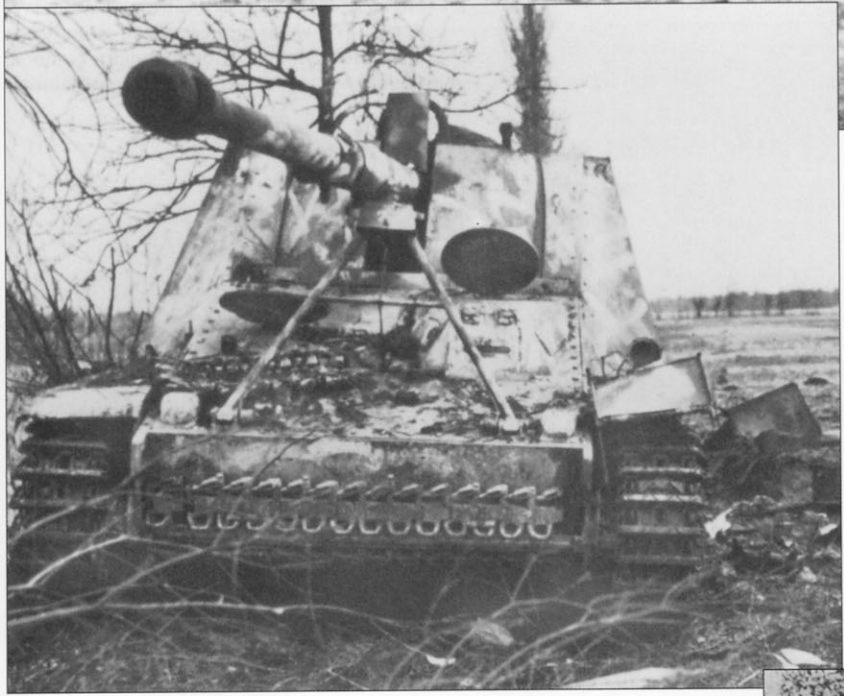
The business end of a 'Nashorn' with its 8.8cm gun in travel lock position. The vehicle has been whitewashed. Its one headlight over the left track guard has a blackout cover. The 'Nashorn' carried a Fu.Spr.Ger.d radio. An MG-34 was carried internally.



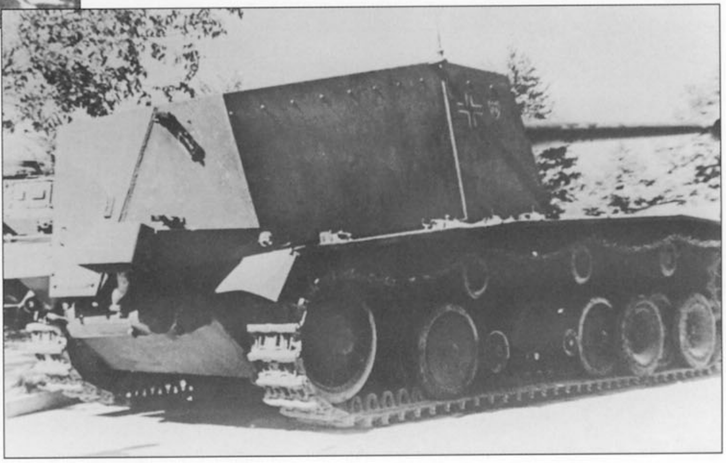
A 'Nashorn' halts in an Italian village awaiting orders to advance in support of its division. Note the heavy gauge wire spot-welded to the side of the superstructure in which to place camouflaging foliage and the canvas gun compartment cover, which appears to be dubbed with camouflage paint. The "211" is in black. Two of the crewmen wear field gray trousers with their black panzer tunics. This vehicle belongs to 2.Kompanie, schwere Heeres-Panzerjäger-Abteilung 525 near Anzio, March 1944.



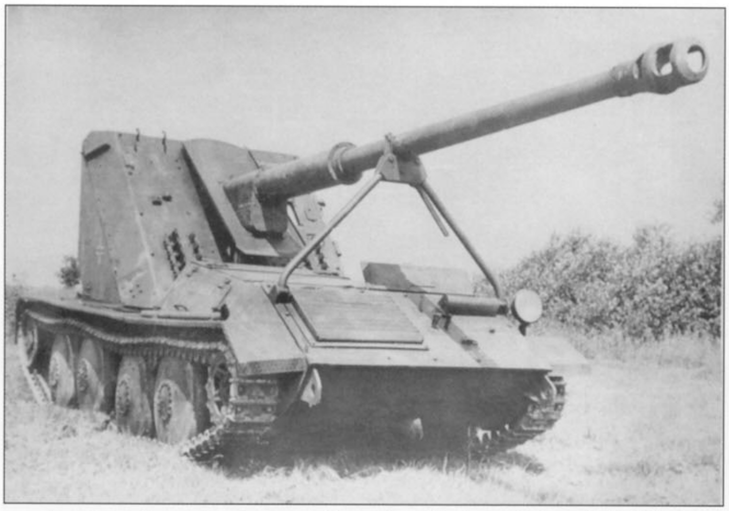
A 'Nashorn' and a Pz.Kpfw.IV are among elements assembling for a counterattack against American forces. The Pz.Kpfw.IV is fitted with sheet metal skirting around the turret. The side skirts, although the mounting rails are apparent, are not present.



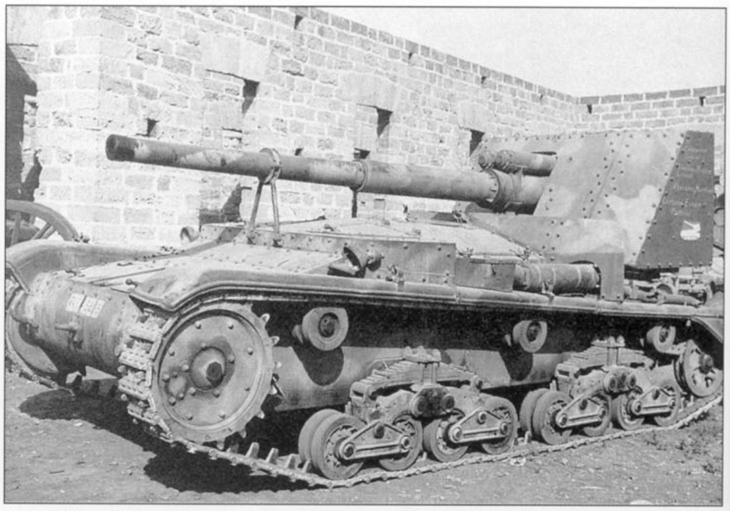
This 'Nashorn' took a direct hit to the right of the driver's compartment. Owing to the wreckage littered about it appears the ammunition exploded. The faded camouflage pattern, probably green and/or brown over dark yellow, has been partly over-painted by whitewash swaths as a hasty winter camouflage. It was knocked out by M10 tank destroyers of the French First Army in the Colmar area of France in early 1945.



In 1942, two12.8cm Selbstfahrlafette L/61 (Panzerselbstfahrlafette V) were built and issued to schwere Panzerjäger-Abteilung 521, for use on the East Front. It mounted the massive 12.8cm (5-inch) PaK 40 L/61 gun. While devastating to any Soviet tank, its rate of fire was slow. Both examples were captured at Stalingrad.



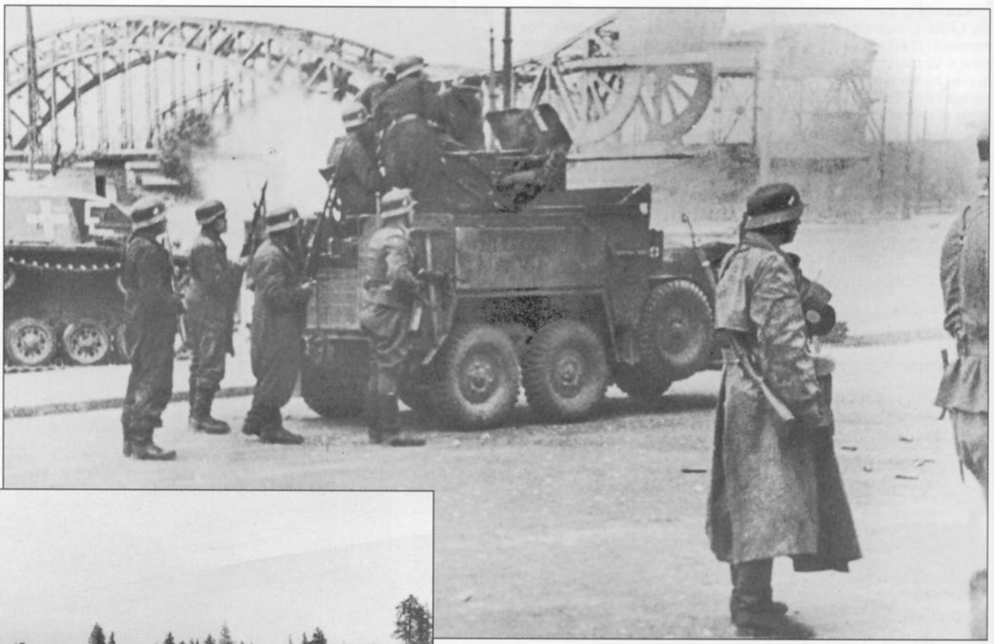
Looking almost too large for its carrier, this is an 8.8cm PaK 43/3 L/71 antitank gun mounted on a Pz.Kpfw.38(d) chassis. It was known as the 8.8cm PaK 43/3 Waffenträger. The gun entered service in late 1943 fitted on an antiaircraft-type cruciform mounting. It was provided to counter the Soviet 122mm gun-armed IS-1 and IS-2 Stalin heavy tanks. For an antitank gun to be successful, as well as survive, it has to be capable of rapid emplacement and displacement. The bulky antiaircraft-type mounting with outrigger arms was not conducive to this and the gun was mounted on several types of chassis, some more successful than others. The gun and its mount were far too heavy for Pz.Kpfw.38(t) and there was insufficient operating space for the crew. The number of 8.8cm rounds that could be stowed was insufficient as well. It was successfully tested in April 1945, too late to go into production.

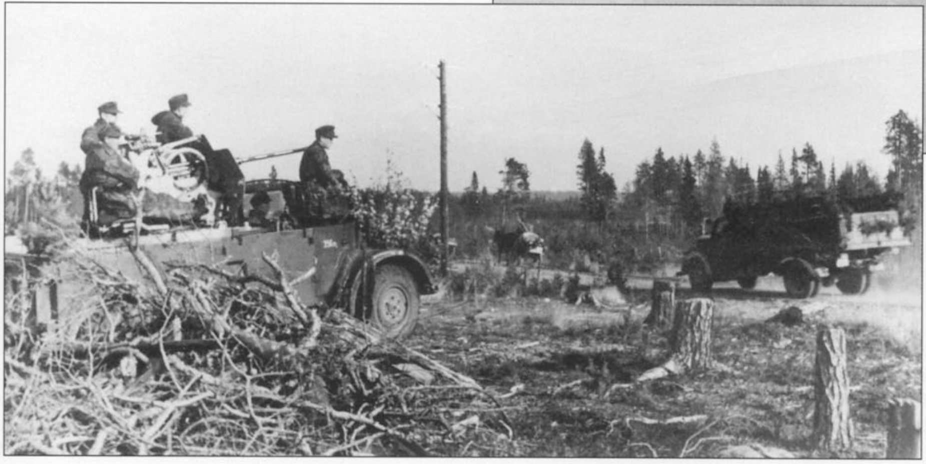


One of the more unusual self-propelled antitank pieces employed by the Germans was this Italian Semovente da 90/53 captured by American forces in Sicily in 1943. The 90mm gun was an antiaircraft weapon, but in this configuration it served as a self-propelled antitank gun and was sometimes employed as an artillery piece. The gun, not the vehicle, was designated the 9cm FlaK 41 by the Germans. The crew stood on the ground to operate the weapon, a major shortcoming for a self-propelled antitank gun. It did have an 80-degree traverse, much wider than Marders. It was built on the M14/41 tank chassis in which the engine was relocated forward. Only eight rounds of ammunition were carried aboard the vehicle. An ammunition carrier modified from an L.6 light tank carrying 26 rounds and a trailer with another 40 rounds accompanied it. The Germans employed some in northern Italy as artillery after the Italian surrender, but found the long-barreled gun difficult to use in the mountains where howitzers could deliver more effective fire on reverse slopes. The white gun silhouette is an Italian unit symbol. The writing above the symbol: "Commanding General, Aberdeen Proving Ground, Aberdeen, Maryland, Captured Enemy Material."

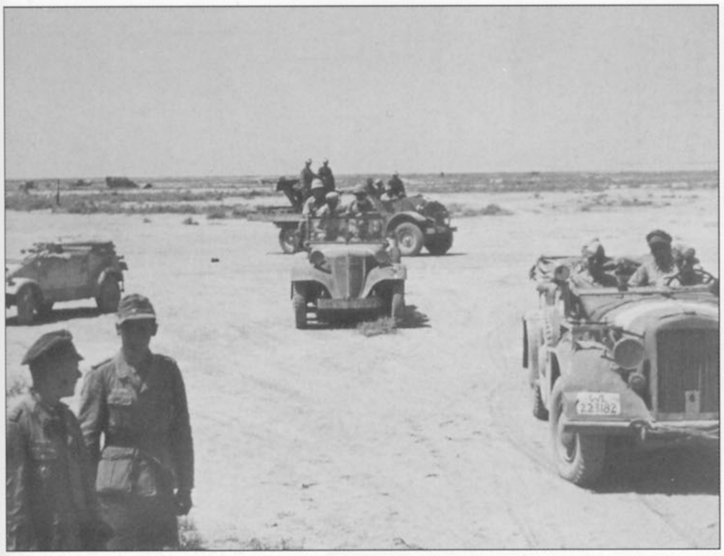
## Self-propelled Antiaircraft Guns (Flakpanzer)

A 2cm FlaK 30 is mounted on a Krupp L2H 143 light truck. The Solothurn-designed FlaK 30, produced by Rheinmetall-Borsig, was the standard light antiaircraft gun prior to the war, but its rate of fire was too low (280 rounds per minute) and it suffered from feed problems that were never rectified. The Mauser-designed FlaK 38 replaced it, but the FlaK 30 remained in limited use through the war. The Krupp light truck was the standard motorized infantry transport and a similar version, the Krupp-Protze (limber), was employed to tow 3.7cm anti-tank guns and 2cm flak.

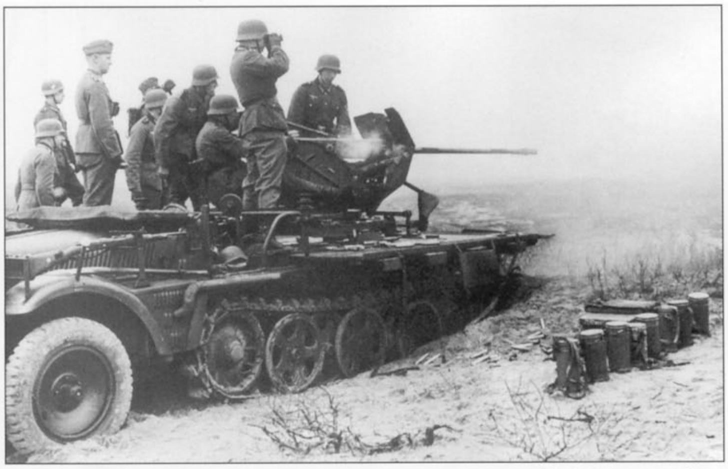




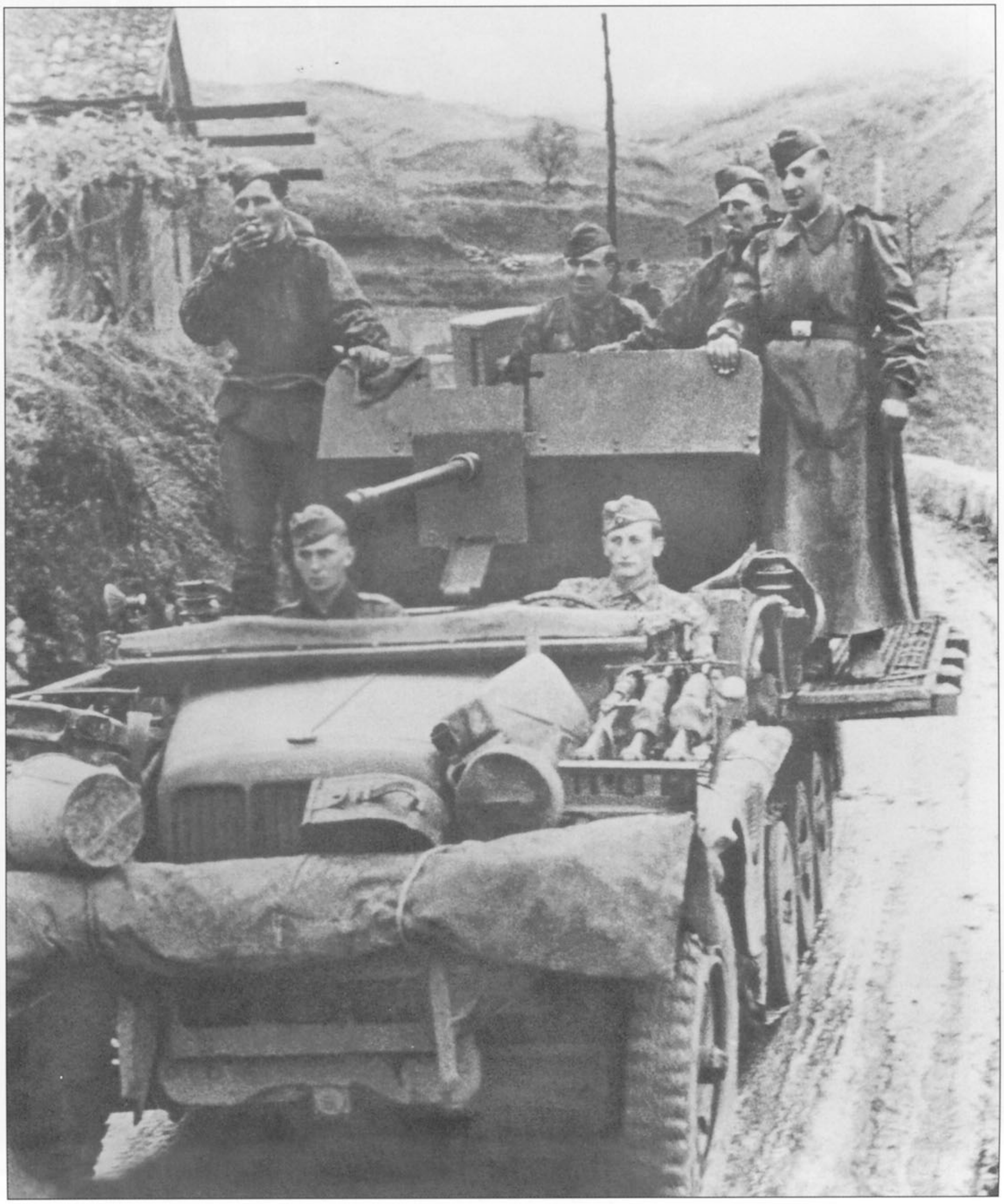
A unit has retrofitted a 2cm FlaK 38 aboard a light truck. Such improvisations were common in German forces, especially on the Eastern Front where supply shortages and replacement equipment was slow in arriving, if it arrived at all. The truck's door is marked inexplicably with "35Km" in white.



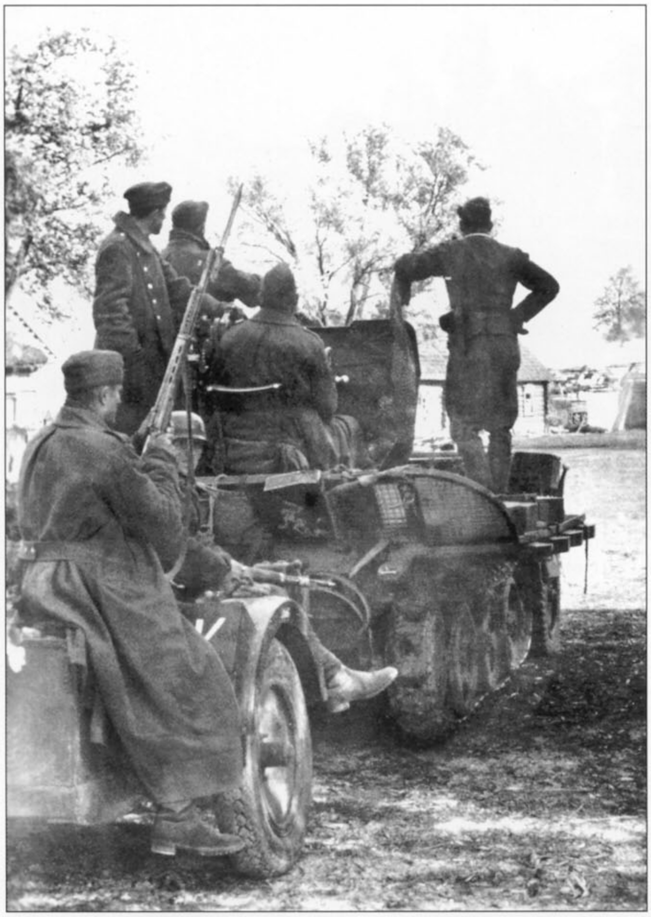
Out in the desert of North Africa, light Horch cars and Kübelwagen halt for a briefing. In the distance is a captured British lorry mounting a 2cm FlaK 30. It has a national flag draped over the engine deck for aerial recognition.

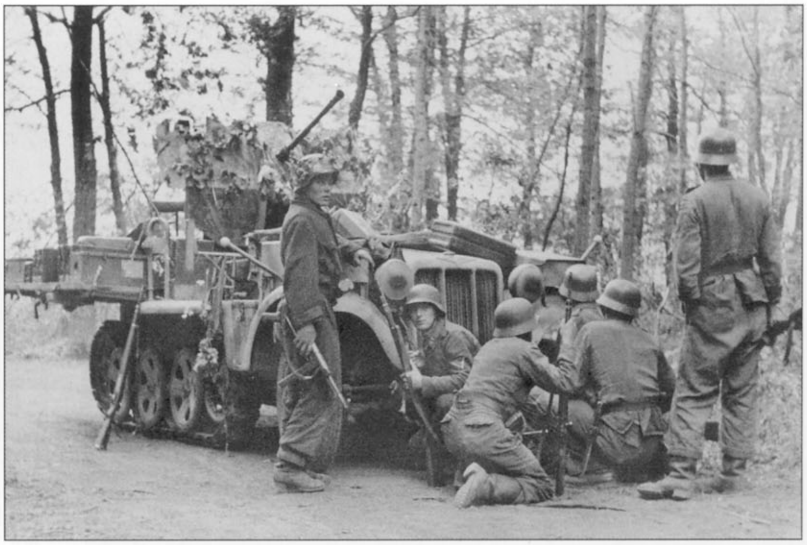


Photographed during a training exercise, this 2cm FlaK 30 mounted on a 1-ton Sd.Kfz.10/4 half-track pumps out rounds. The Flak.30 had a practical rate of fire of 120 rounds per minute. The crew's gasmask canisters rest on the ground.



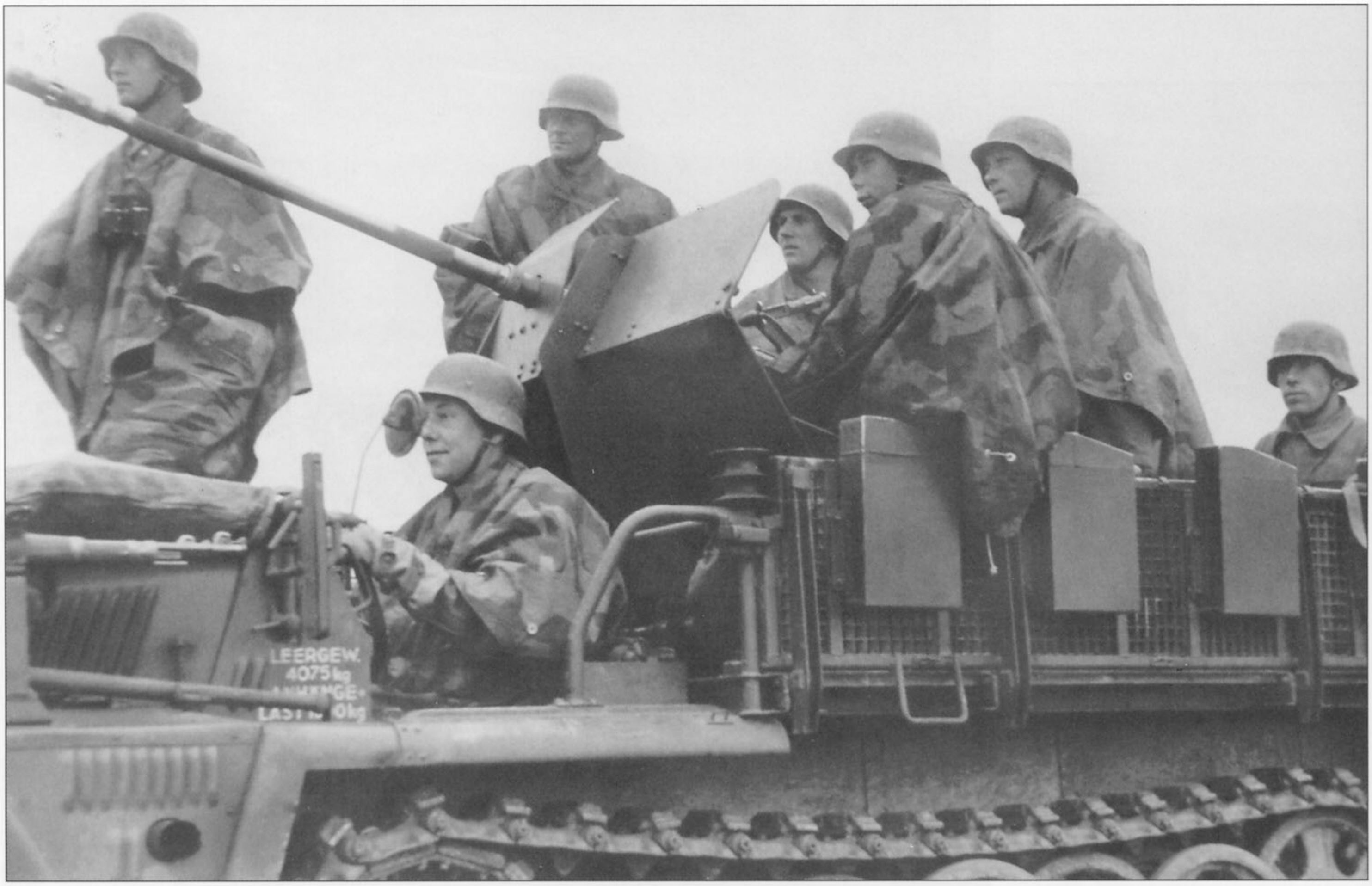
This 2cm FlaK 30 is seen on its more common self-propelled chassis, a 1-ton Sd.Kfz.10/4 half-track. The 2cm FlaK 38 was mounted on the same vehicle, in which case it was known as a Sd.Kfz.10/5. The sideboards had to be lowered in order to traverse either weapon and also provided the crew more workspace. The four projections beneath the sideboards are the tops of spare magazine containers. Note the rack on the vehicle's left fender for three carbines.





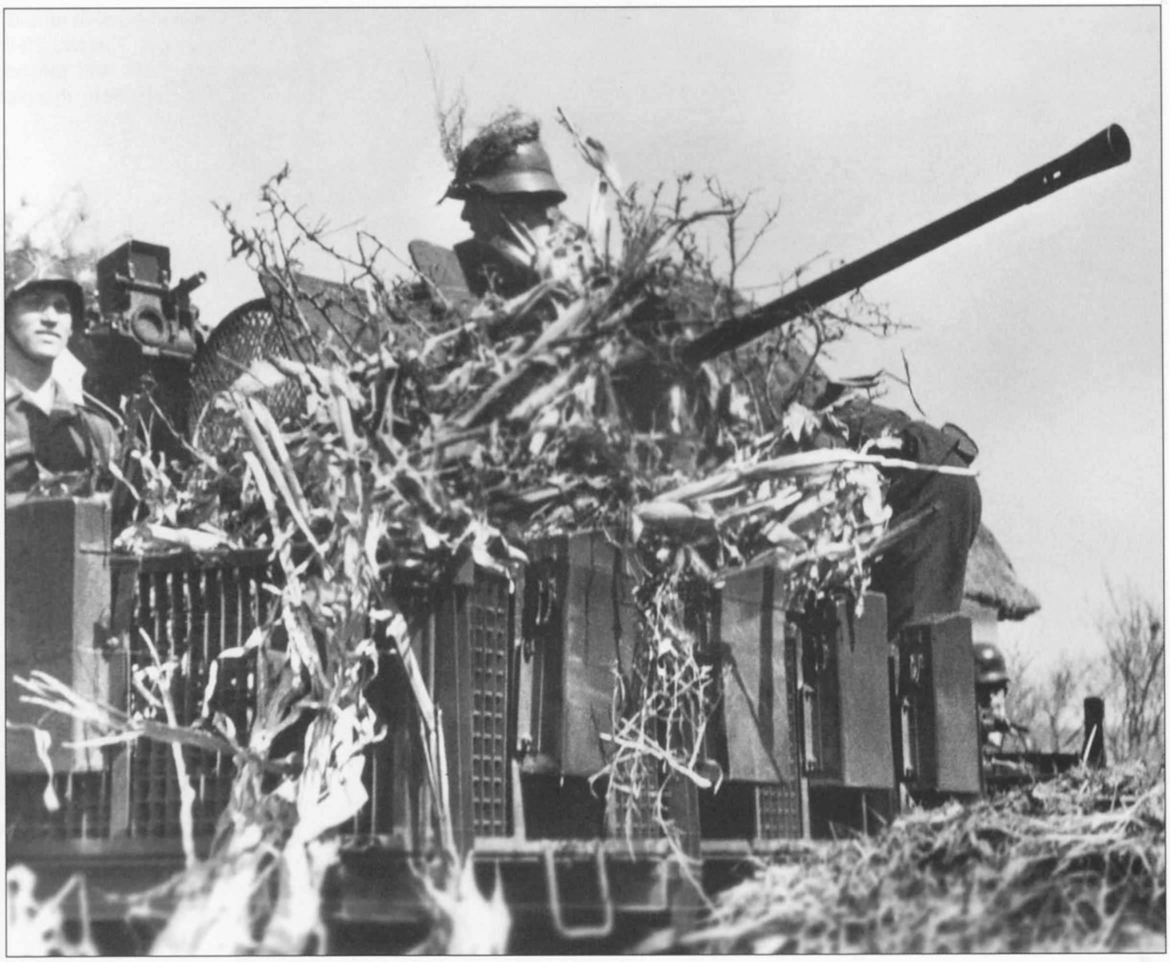
The Luftwaffe crew of this 2cm FlaK 38 on a Sd.Kfz.10/5 half-track is demonstrating caution, apparently because of sniper fire. Note the crewman to the left armed with an MP-40 machine pistol and two stick hand grenades. The angled rods with white balls at the ends served as visual guides for the driver when maneuvering in tight spaces. More often than not though these were knocked off most vehicles. The blackout driving light slits have been sprayed with black paint, as even the narrow beam of light was deemed too bright.

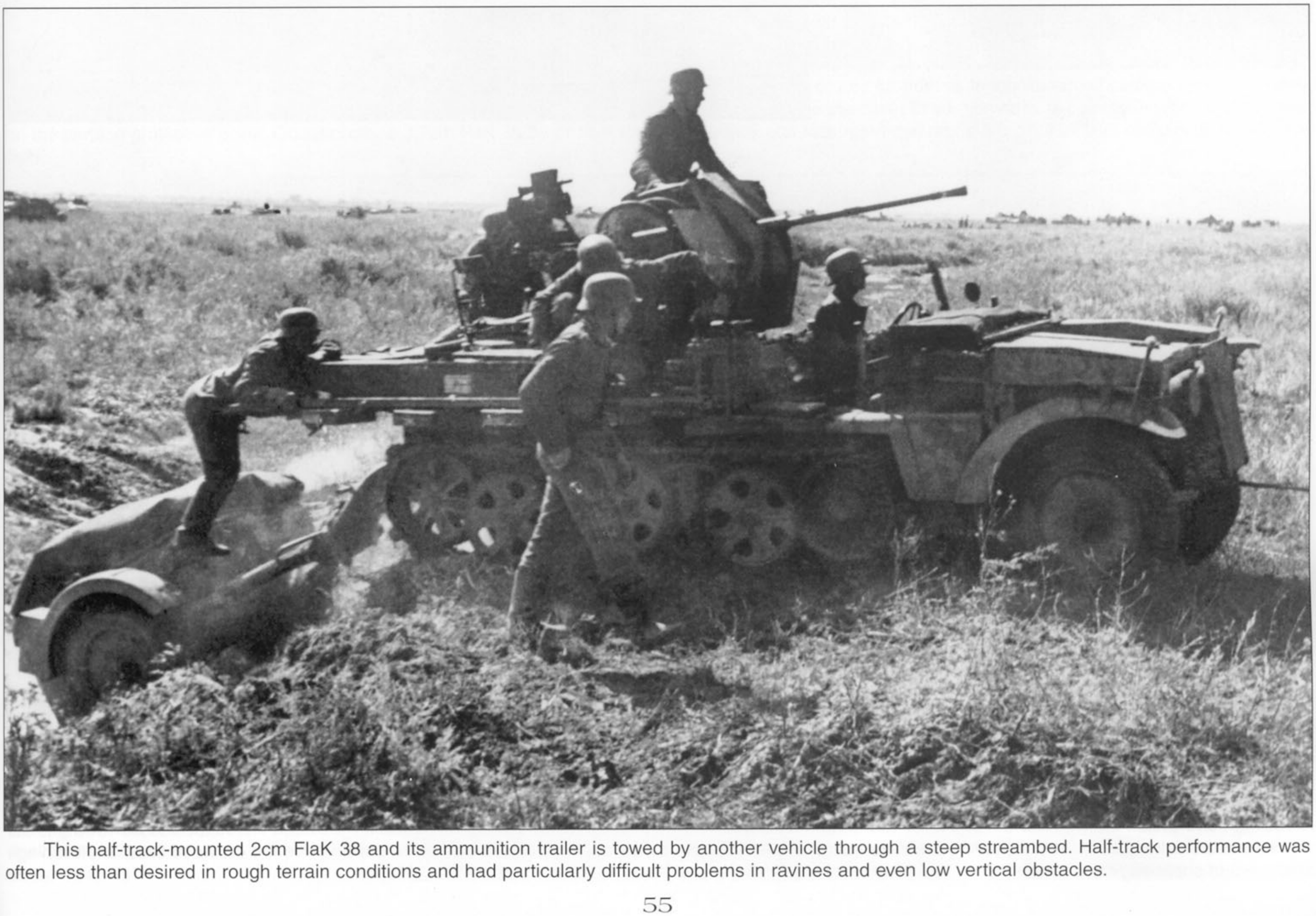
A 2cm FlaK 30-armed Sd.Kfz.10/4 half-track crew scans for targets in a Russian village. The crewman sitting on the ammunition trailer carries a Soviet 7.62mm Tokarev SVT-40 semiautomatic rifle, called an Sl.Gew.259(r) by the Germans. The partly obscured white "K" on the trailer's fender storage box identifies it as belonging to Panzergruppe von Kleist.



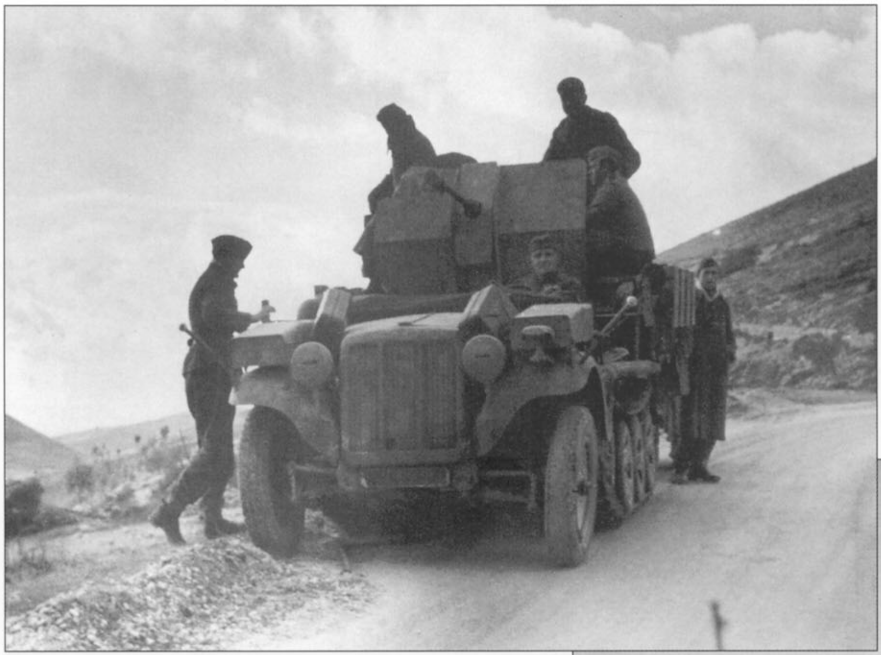
A half-track-mounted 2cm FlaK 30 crew wears shelter capes for rain protection. They could also be buttoned together to make a small tent. The capes' three-color (light and dark green, dark brown) splinter camouflage pattern is apparent. The FlaK 30 may be differentiated from the FlaK 38 by its straight flash suppressor; the FlaK 38's is cone-shaped. The Sd.Kfz.10/4 half-track's empty and loaded weight is painted in white letters beside the driver's compartment.

The crew of this half-track-mounted 2cm FlaK 38 has camouflaged the weapon with corn stalks and other foliage. They have also parked behind a low mound for additional cover and concealment.



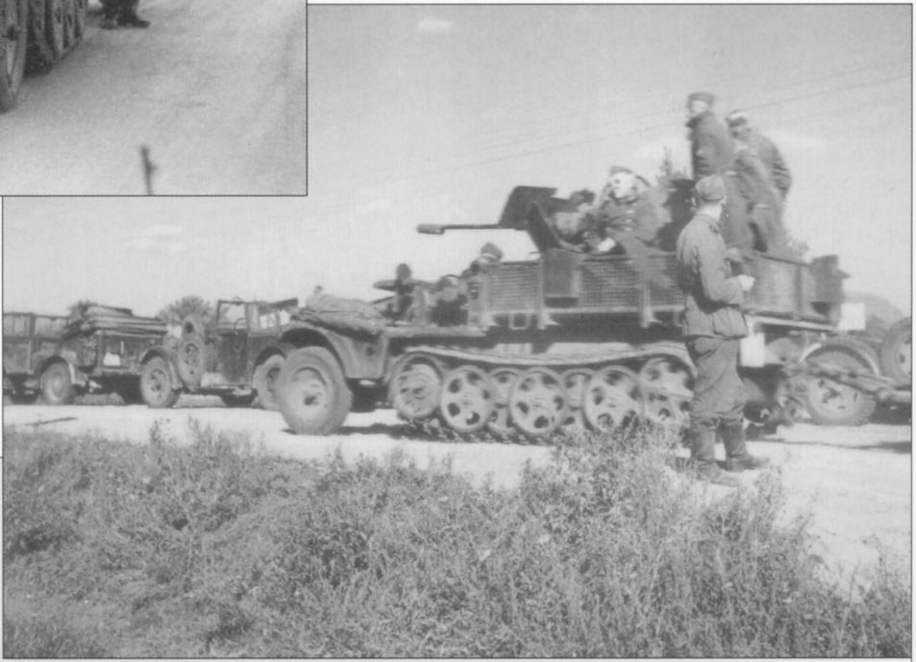


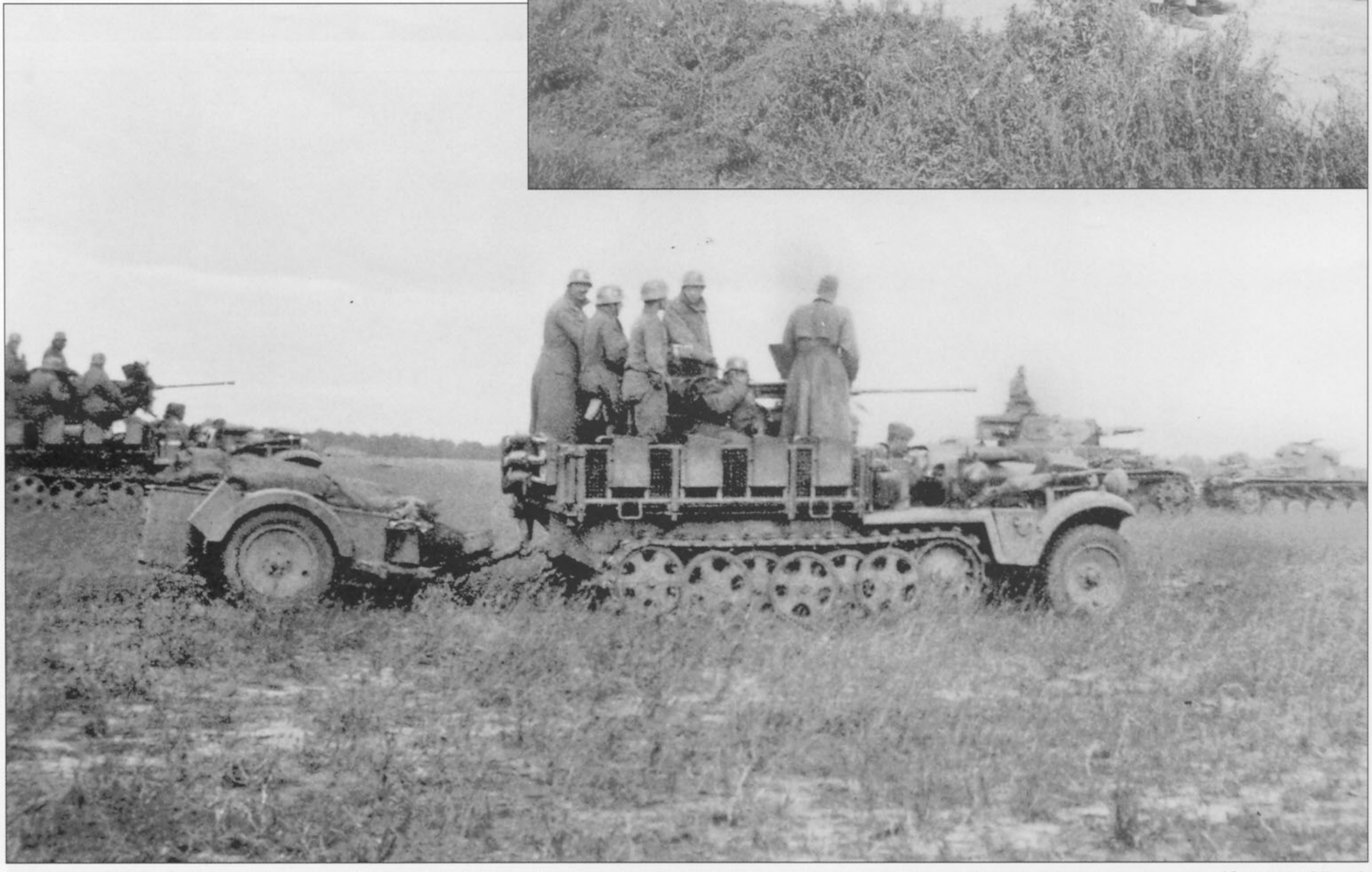
This half-track-mounted 2cm FlaK 38 and its ammunition trailer is towed by another vehicle through a steep streambed. Half-track performance was often less than desired in rough terrain conditions and had particularly difficult problems in ravines and even low vertical obstacles.



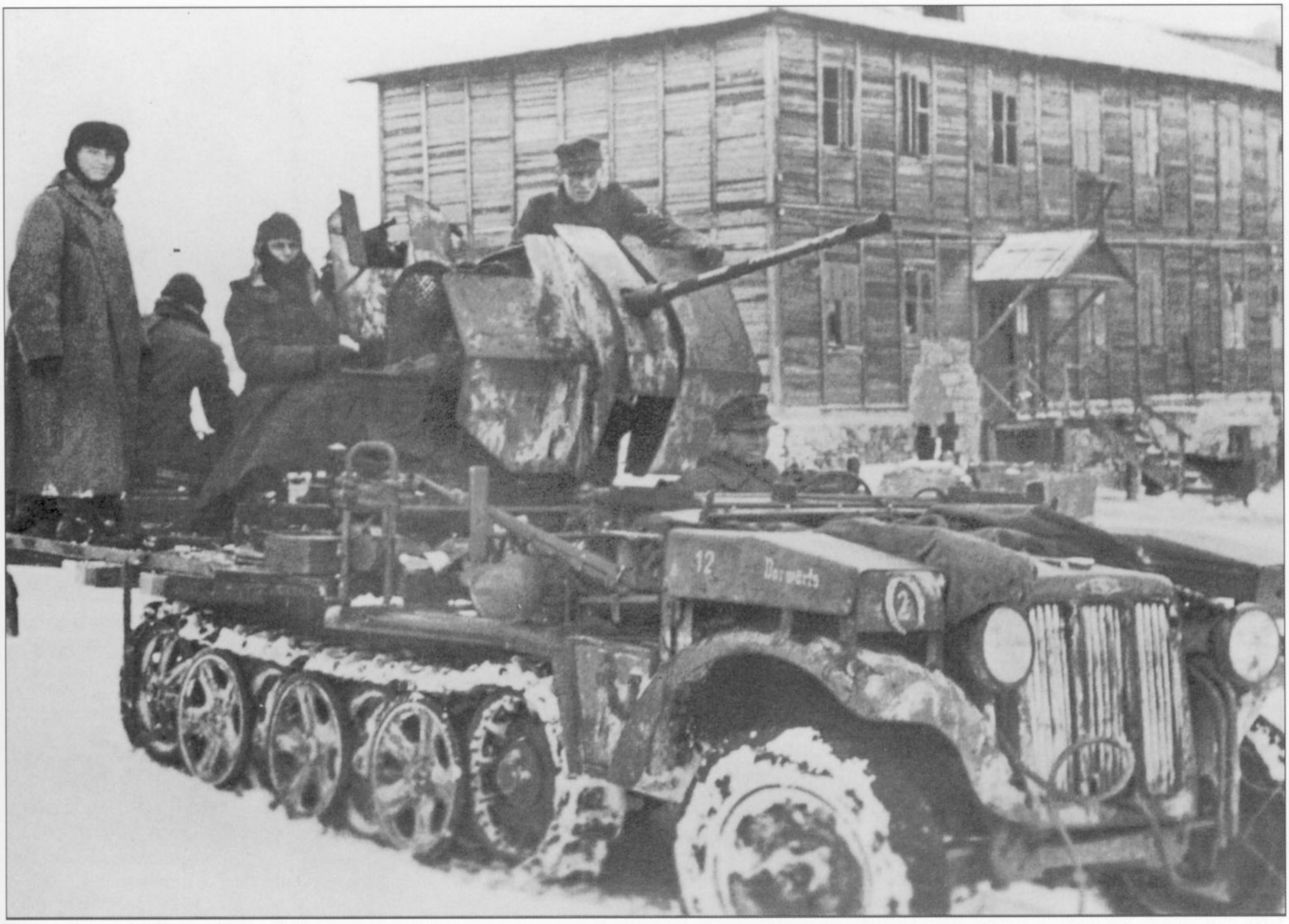
A half-track-mounted 2cm FlaK 38 crew awaits orders to move out. The two 20-liter fuel cans stowed between the carbine racks and the hood indicate this is a non-tactical road march. Note the blackout driving light covers on the headlights.

In milder weather, though still chilly as evidenced by the wear of greatcoats, a 2cm FlaK 38 on a Sd.Kfz.10/5 half-track waits beside a convoy it is escorting. Note the canvas muzzle cover. The towing bars of the gun's ammunition trailer can be seen.

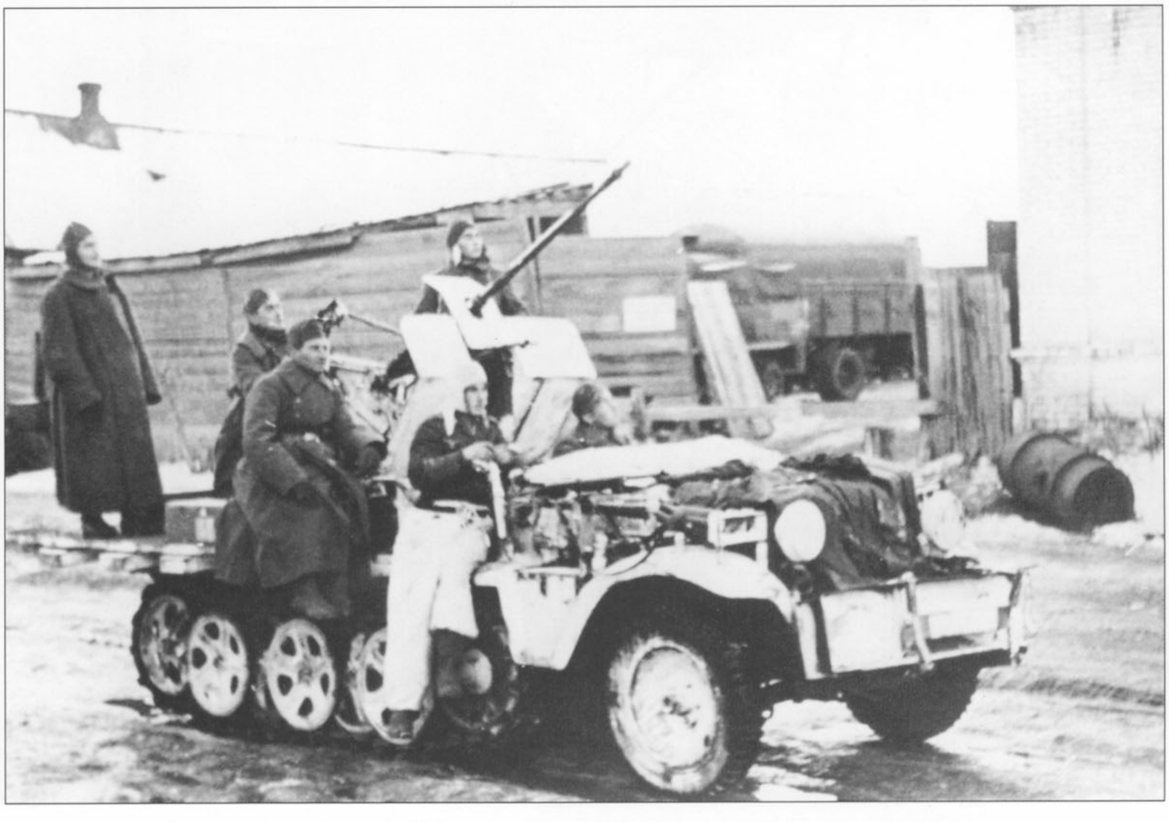




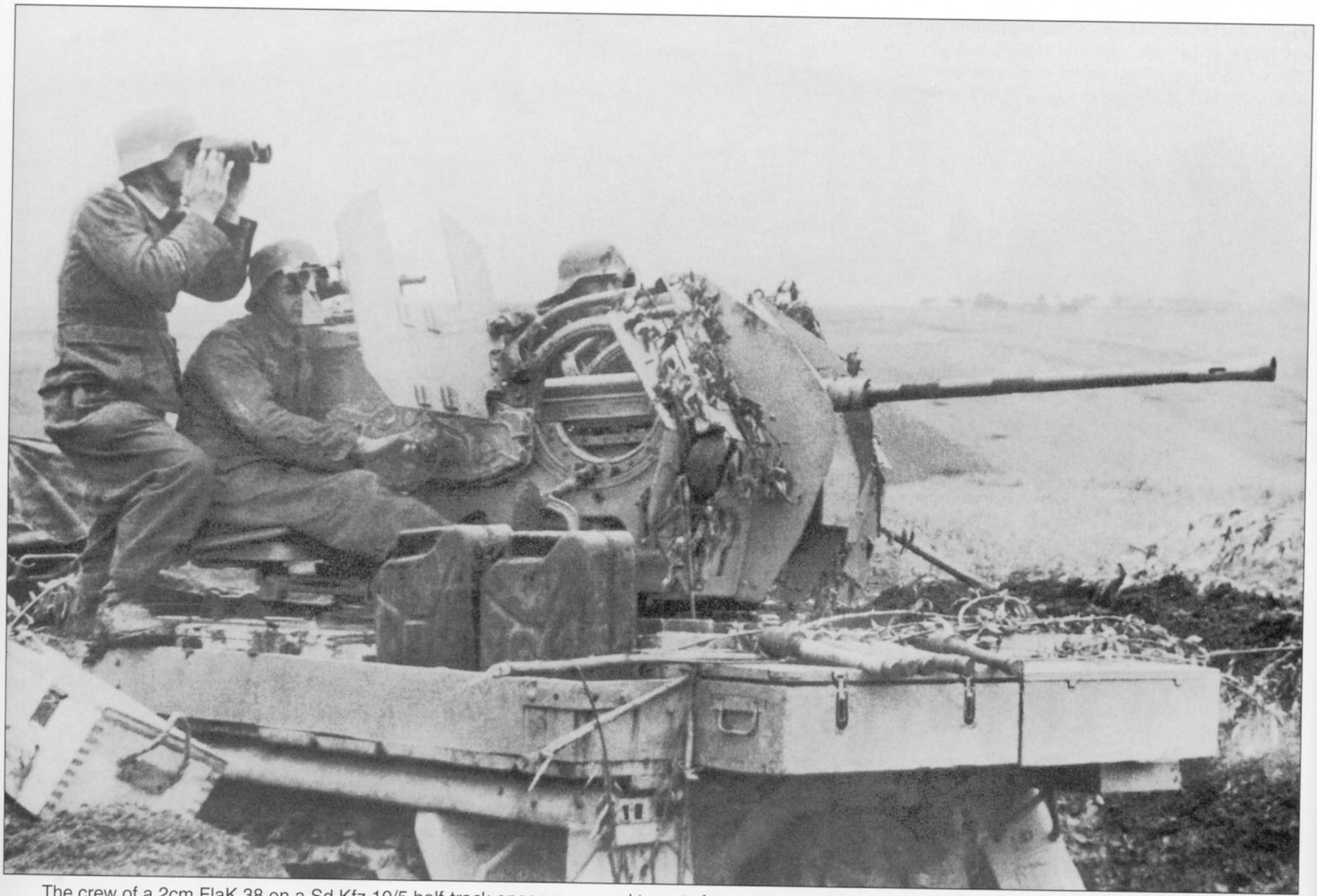
The seven-man crew of this 2cm FlaK 38 on a Sd.Kfz.10/5 half-track demonstrates its cramped space, although the gun commander (Geschützführer) would normally ride in the front seat beside the driver. The trailer carried crew equipment and additional ammunition. A second Sd.Kfz.10/5 can be seen the left background while Pz.Kpfw.IV and II tanks are to the right background. Half-track-mounted 2cm guns frequently provided fire support to advancing tanks and were especially valuable for destroying machine gun and anti-tank gun positions. They would also place suppressive fire on wood lines and buildings suspected of sheltering the enemy.



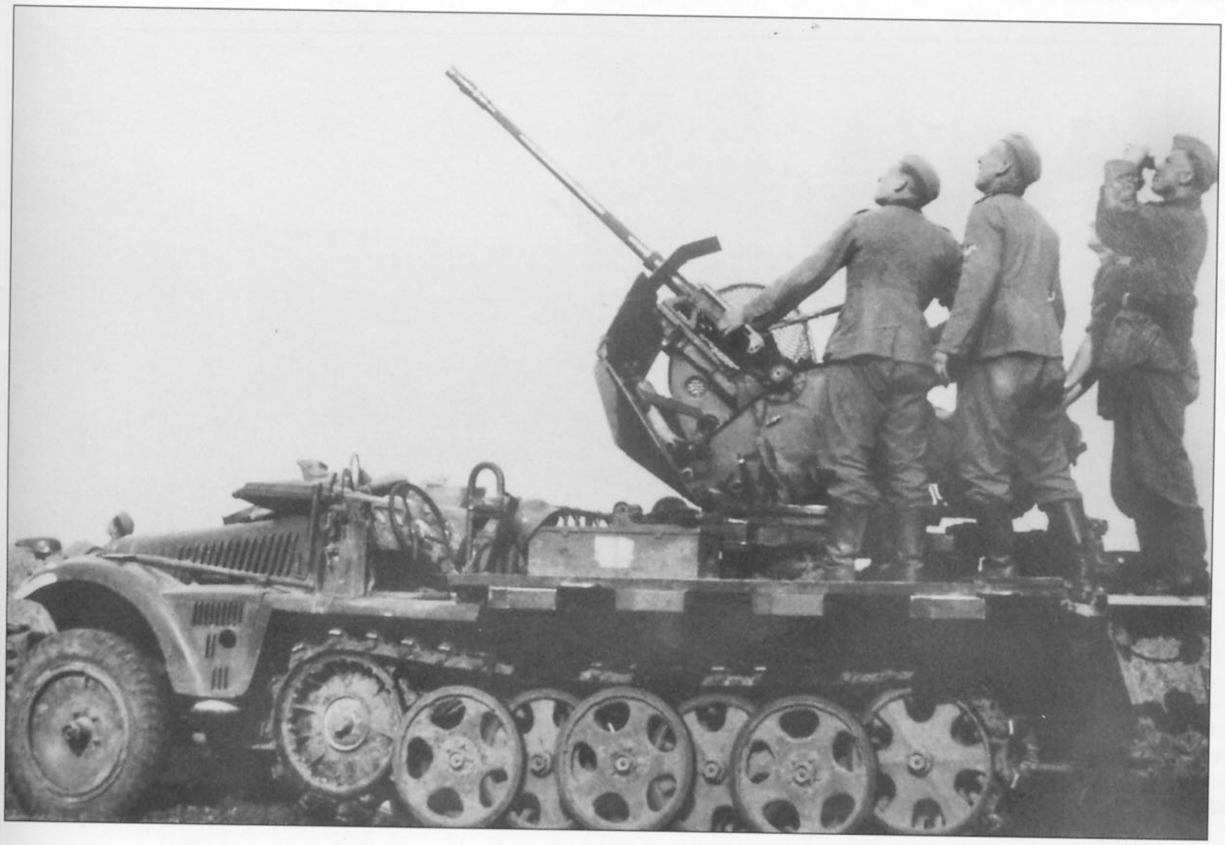
This 2cm FlaK 38 L/112.5 on a Sd.Kfz.10/5 half-track has managed to retain the protective covers for both its fender-mounted carbine racks. A carbine is lying on the seat beside the driver where it can be more rapidly retrieved. The reminder of how the cover fitted, Vorwärts, is painted in white Gothic script on the carbine protective cover. Occasionally a 3.7cm PaK 35/36 or 5cm PaK 38 anti-tank gun was retrofitted on Sd.Kfz.10/4 or 10/5 chassis by units in the field.



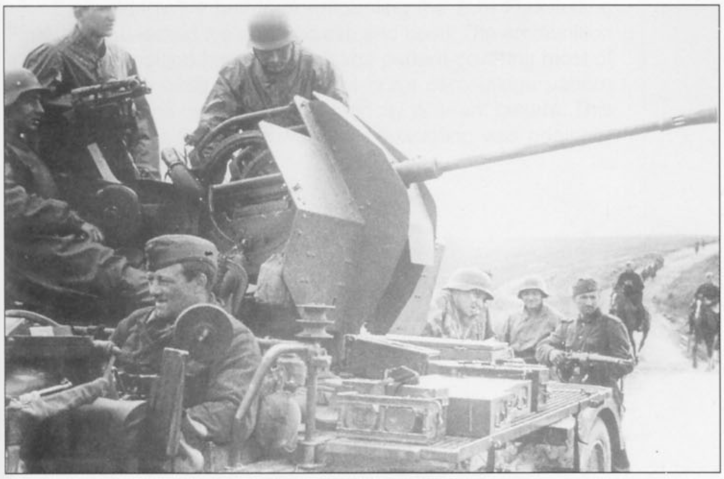
This 2cm FlaK 38 on a Sd.Kfz.10/5 half-track has been whitewashed. A canvas tarp covers the hood and engine grill in an effort to keep the engine from freezing. The crew's carbines are stowed unprotected in the fender racks. Russia, winter 1942/43.



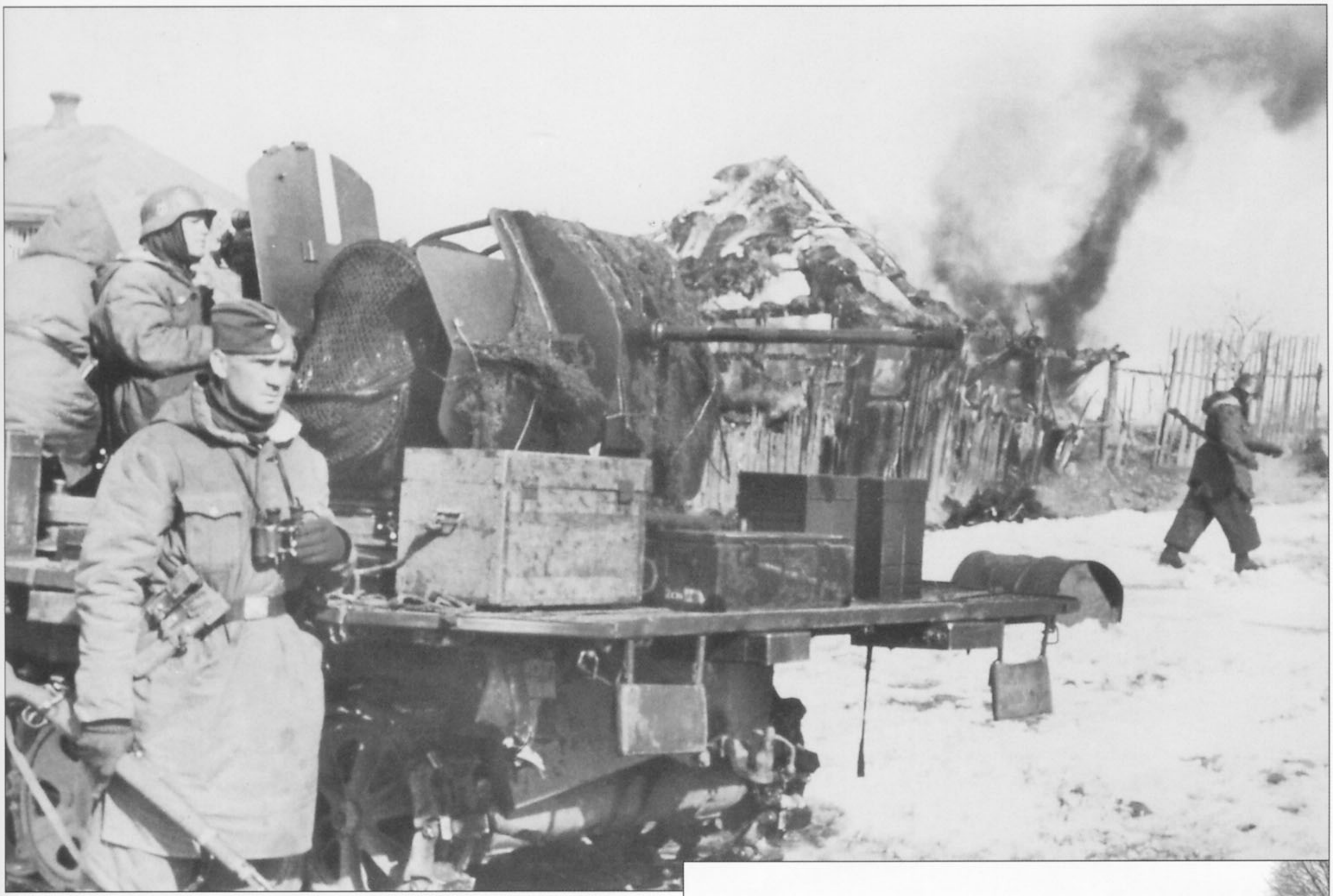
The crew of a 2cm FlaK 38 on a Sd.Kfz.10/5 half-track engages ground targets from a dug-in portion. Besides being an effective antipersonnel weapon, the 2cm gun was deadly to lightly armored vehicles. The sideboards have been removed from this vehicle. Both the FlaK 30 and 38 used 20-round magazines. From most angles the FlaK 38 and be differentiated from the FlaK 30 by the former's separate smaller gunner's shield on the right side of the gun, the large circular elevating trunnions, and the flash suppressors as described previously. Note the Stg.24 stick hand grenades on the rear storage boxes for close-in defense of the gun position.



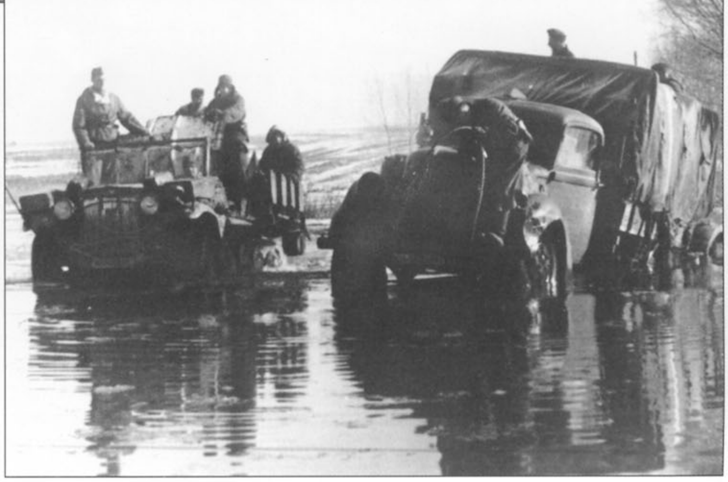
The crew of a 2cm FlaK 38 on a half-track scans the sky for enemy aircraft. The crews of self-propelled guns had the luxury of being able to stow their equipment on their vehicle or its ammunition trailer.



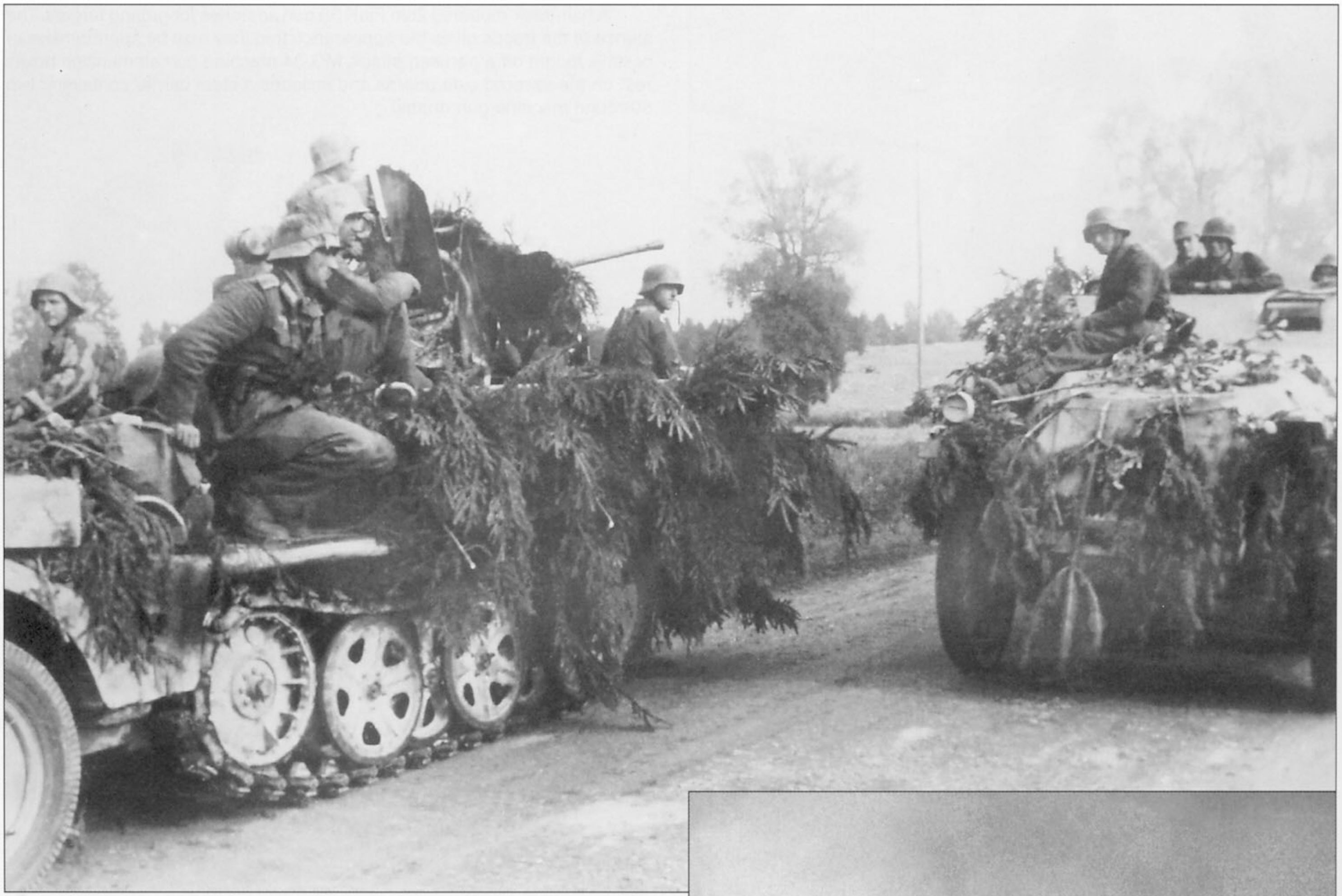
A half-track-mounted 2cm FlaK 38 gun searches for ground targets. The stance of the troops gives the appearance that they may be apprehensive of or have fought off a partisan attack. MG-34 machine gun ammunition boxes rest on the lowered side boards and includes a steel carrier containing two 50-round machine gun drums.



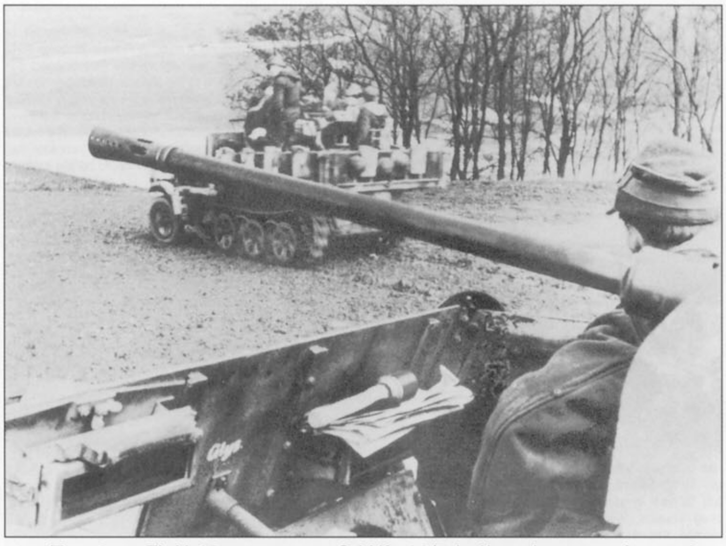
A German SS unit leaves a Russian village devastated as a 2cm FlaK 38 on a Sd.Kfz.10/5 half-track covers the infantrymen. The mesh housing on the right side of the gun prevented ejected cartridge cases from hitting nearby crewmen. It was frequently removed though. Vehicle crews scrounged all sorts of boxes, cases, and containers in which to carry personal and crew gear. The gun commander, though carrying a Kar.98k carbine, wears MP-40 machine pistol magazine pouches. He had probably picked up another crewman's weapon to take long-range shots. He is wearing the SS fur lined anorak.



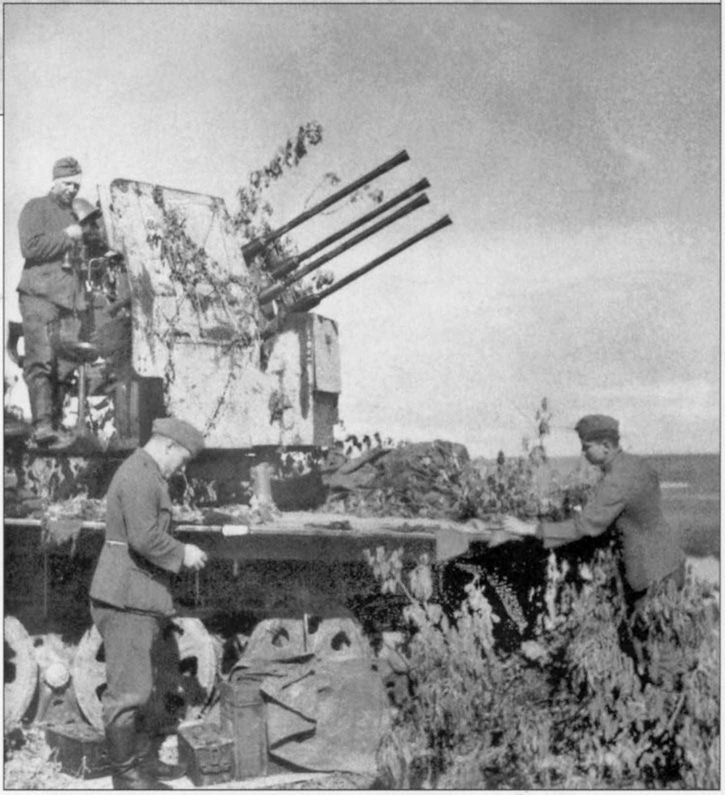
A 2cm FlaK 38 on a Sd.Kfz.10/5 half-track fords a stream swollen by the 1943 spring snowmelt. The crew still wears the reversible winter uniform. The Opel Blitz truck driver uses this opportunity to siphon water into his radiator. This was one of the widest used cargo trucks.



A well camouflaged 2cm FlaK 38 on a Sd.Kfz.10/5 half-track halts beside a road as Panzergrenadiers aboard a Sd.Kfz.251/1 Schützenpanzerwagen armored personnel carrier passes.

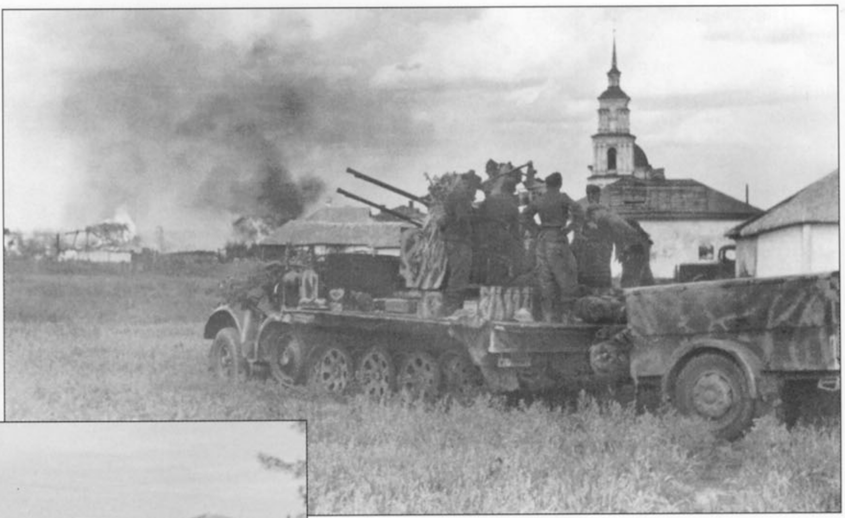


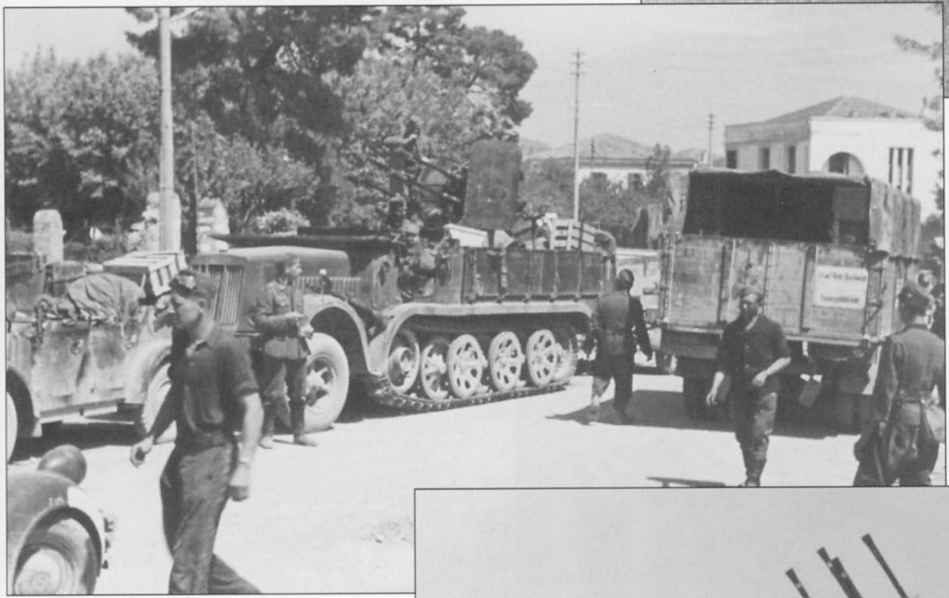
Two 2cm FlaK 38 guns on a Sd.Kfz.10/5 half-tracks move forward to support an infantry attack. These are later models, which were fitted with a forward armor shield behind the driver's compartment. The flash suppressor also served as a muzzle break to reduce recoil. On the far half-track the four sideboard-mounted magazine containers can be seen along with the two on the rear tailgate plus stowed steel helmets. Note the conveniently stowed stick hand grenade. The box in which it is stowed contains data sheets with diagrams identifying the vulnerable points on different enemy armored fighting vehicles.



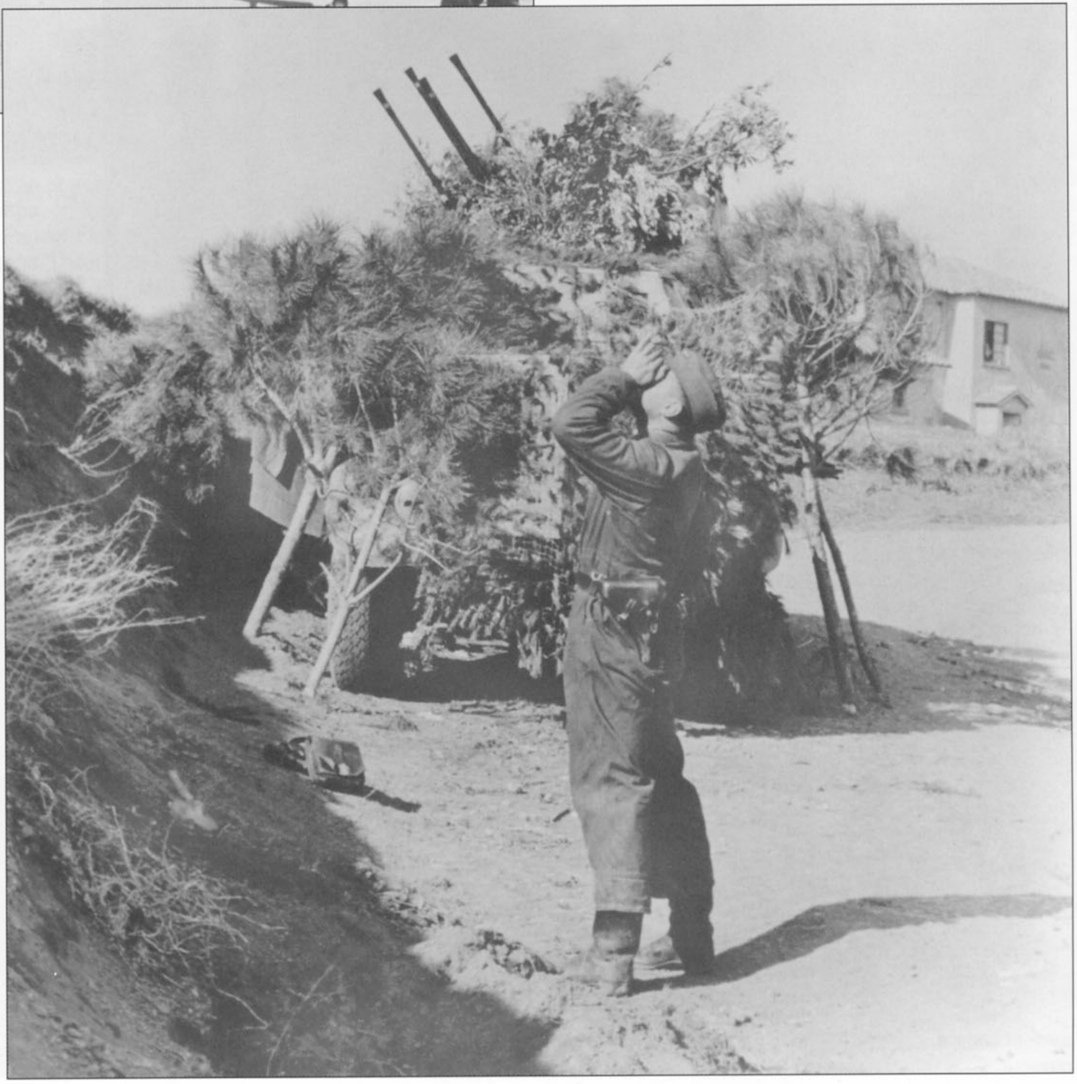
The Sd.Kfz.7/1 medium half-track mounted a 2cm Flakvierling FlaK 38 quad anti-aircraft gun. This was a specially modified version of the 8-ton capacity Sd.Kfz.7 half-track prime mover usually used to tow artillery and was also the standard prime mover for 8.8cm FlaK. On later versions, the cab was provided with light armor plate. Low unarmored steel side boards had to be lowered when the gun was placed in operation. The lowered sideboards and tailgate provided the crew with additional workspace. The gun was mounted on its standard three-arm platform and could be removed from the half-track bed, with the aid of a crane-equipped half-track, and employed on the ground. The gun's high profile served it well in both the air defense and ground supporting fire role, although it made it more vulnerable in the latter role.

Early Sd.Kfz.7/1 half-tracks mounting the 2cm Flakvierling FlaK 38 quad lacked the armored cab and hood. The ammunition trailer has a mottled heavy camouflage pattern covering most of the dark yellow base coat, while the gun's camouflage pattern covers less of the base coat in a distinctly different pattern. This unit is clearing a Russian town. The Flakvierling was originally developed for shipboard use.



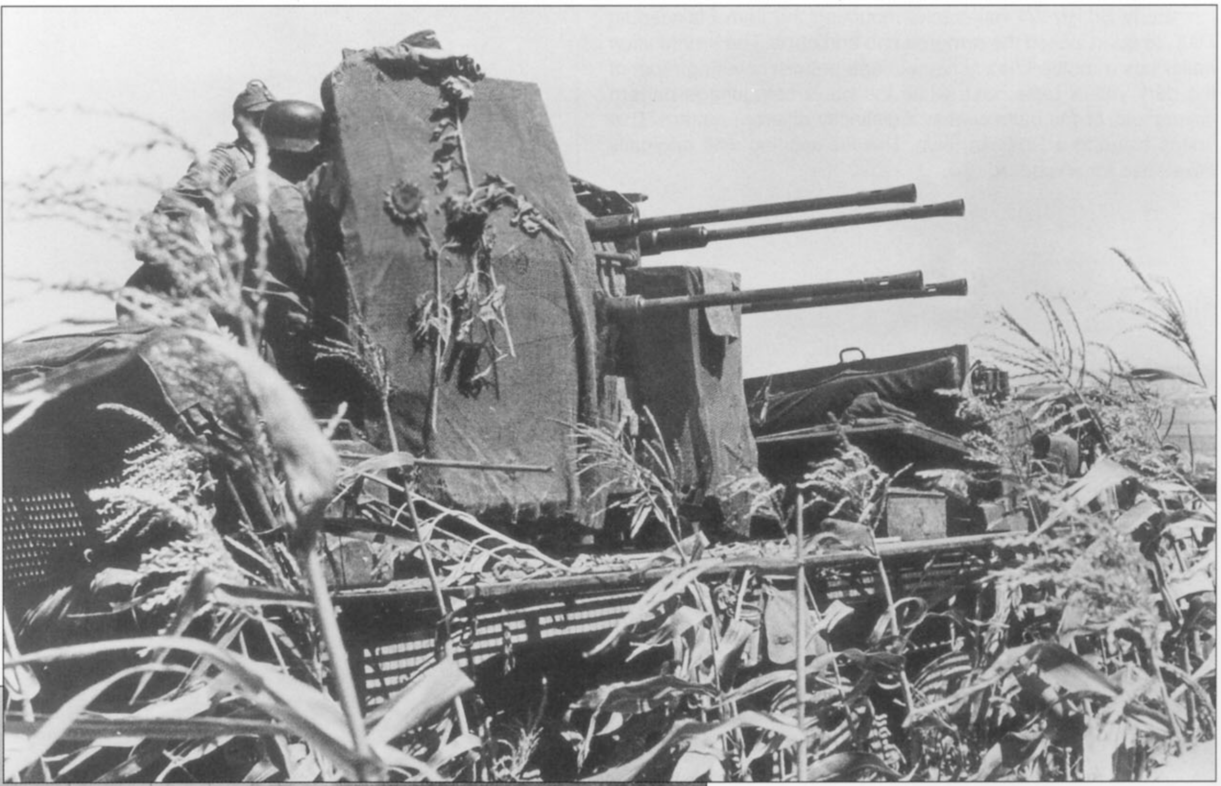


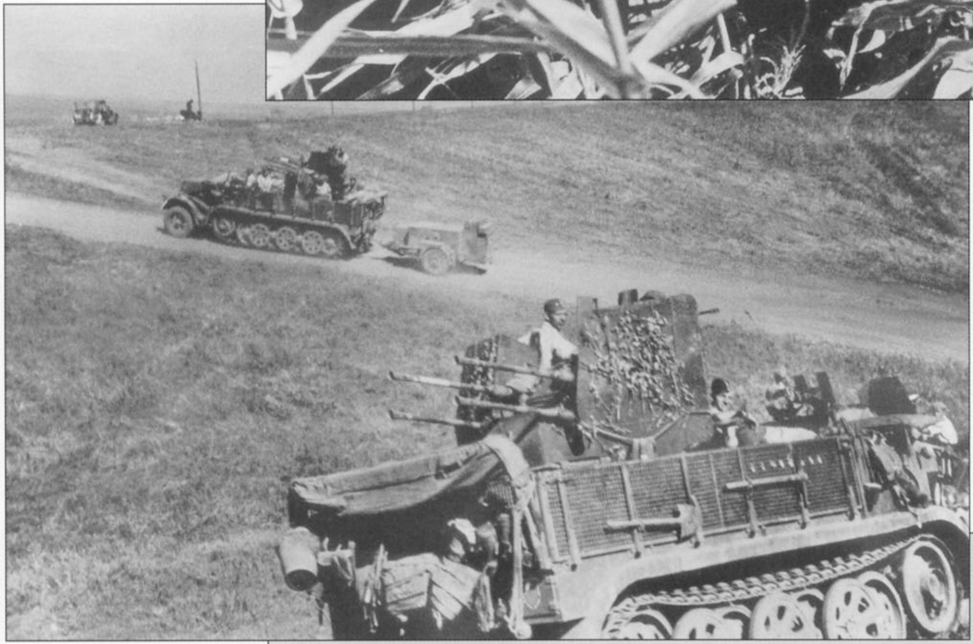
A half-track mounted a 2cm Flakvierling parked in an Italian town as truck traffic passes. The large size of the Sd.Kfz.7/1 half-track is apparent. The vehicle weighed 25,460 pounds (11,550 kilograms) without the gun, ammunition, and equipment.



This half-track-mounted 2cm Flakvierling is heavily camouflaged, so much so that it may interfere with the gun's traverse and elevation. The German soldier simply referred to it as the Vierling, a term similar to "quad."

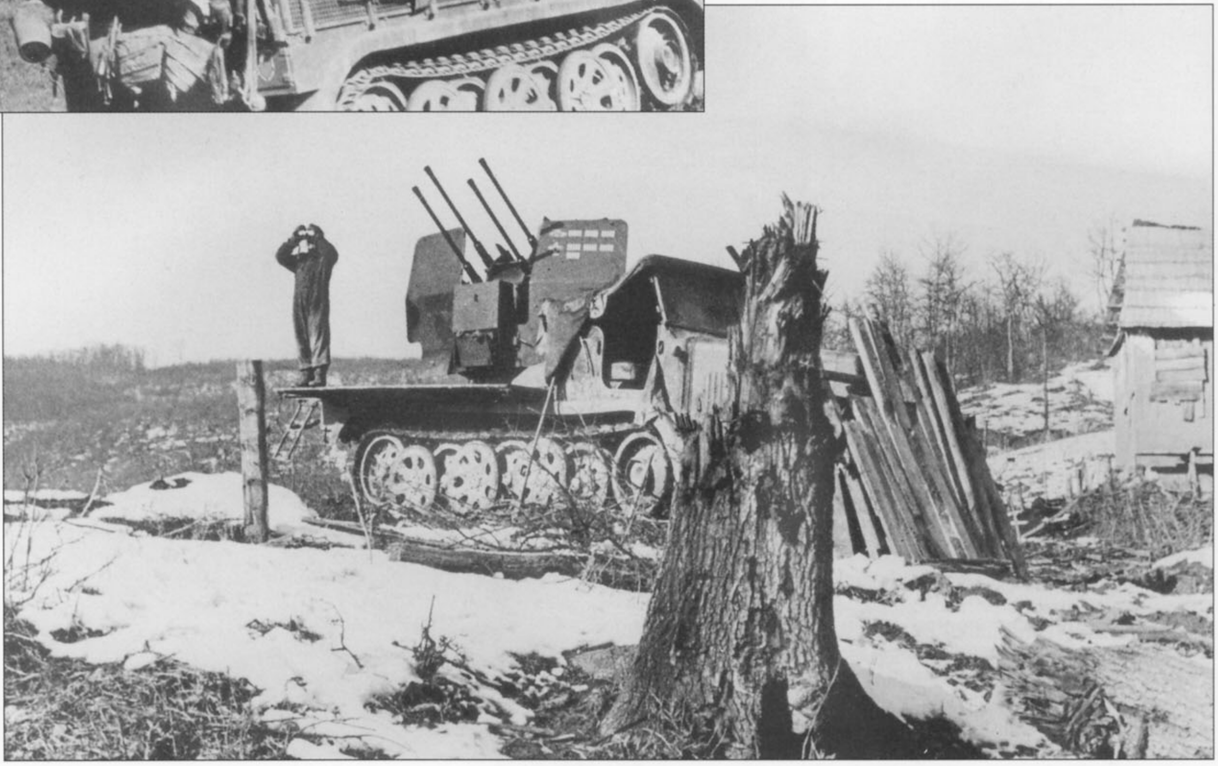
The crew of this half-track-mounted 2cm Flakvierling, positioned in a cornfield, has covered its gun shields with burlap to prevent sun reflections off the flat surfaces and adorned the shield with sunflowers.

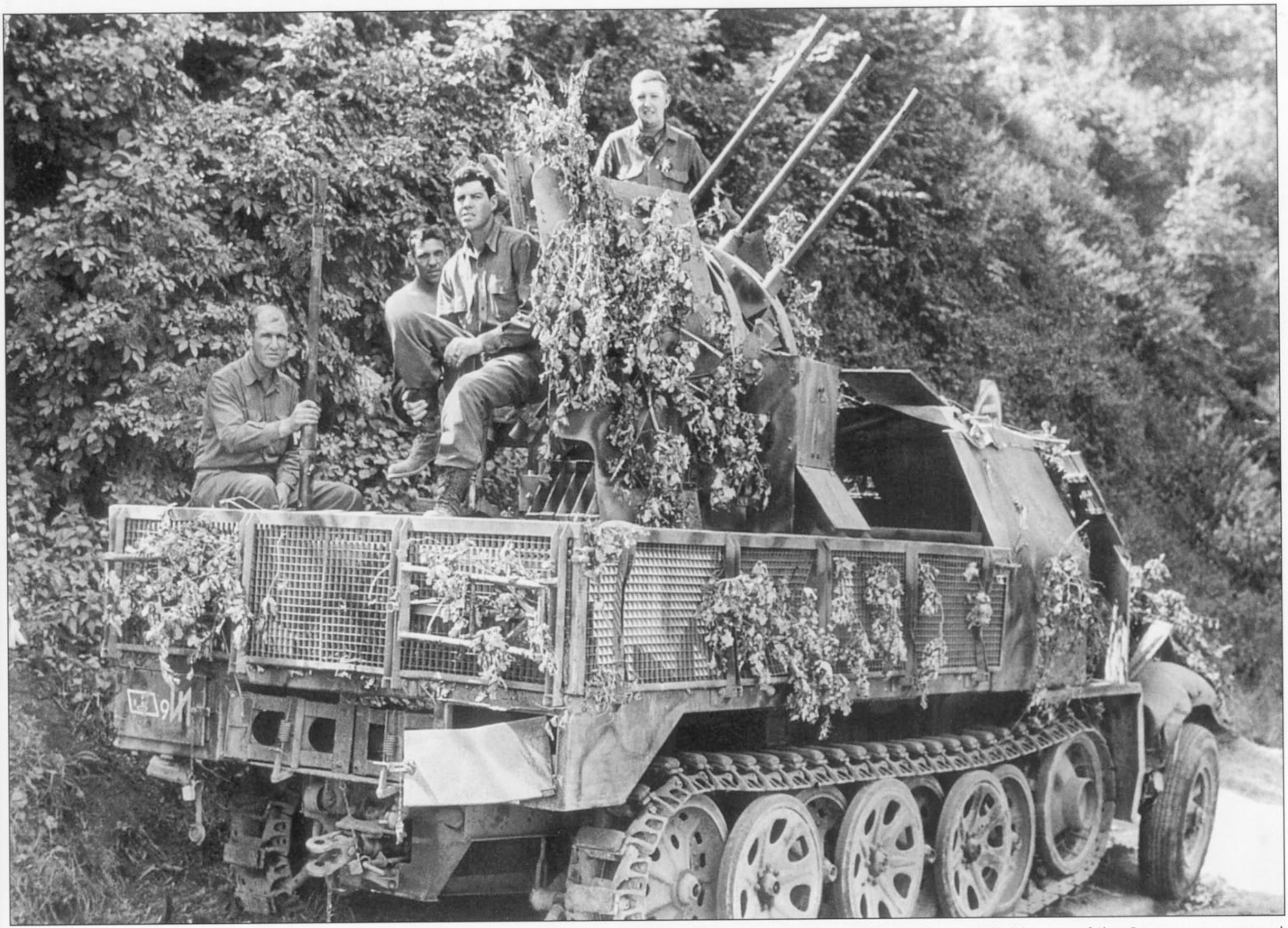




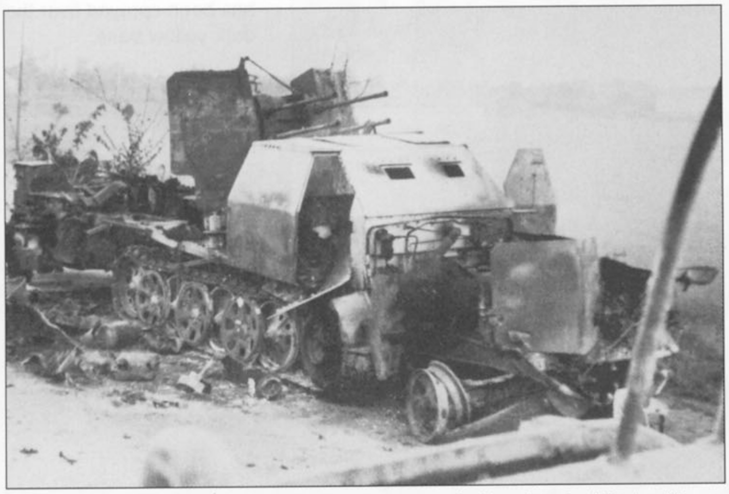
Two 2cm Flakvierling half-tracks escort a column with one oriented forward and the other to the rear. Note the amount of paraphernalia and gear the crew has strapped to the half-track's rear.

A 2cm Flakvierling mounted on a half-track is positioned outside a Russian village. Planks have been stacked around the engine compartment to protect it from the chilling, provide limited protection from small fragments, and break up its profile. Rather than kill rings on the barrel, 2cm guns used tick marks in groups of five. This crew has claimed 15 tanks and 20 aircraft. Other crews used symbols representing machine gun nests and trucks. The crewman wears a seldom seen one-piece coverall.

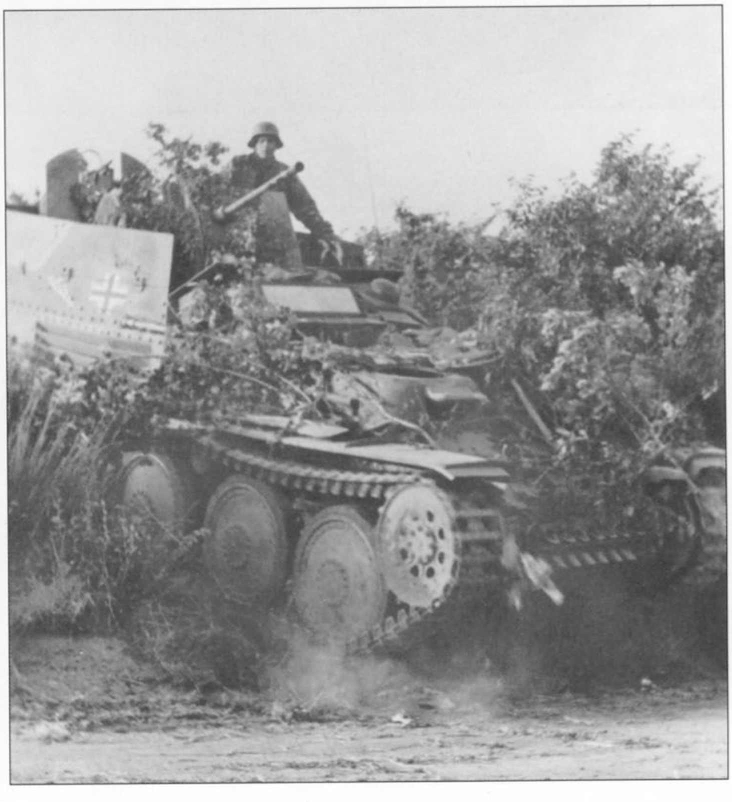




American ordnance personnel inspect an abandoned 2cm Flakvierling Sd.Kfz.7/1 half-track. The soldier on the left holds one of the 2cm guns removed from the mount. The white unit tactical symbol on the left rear identifies it as the Panzer-FlaK-Kompanie of SS-Panzer-Regiment 2 of 2.SS-Panzer-Division "Das Reich" (dark yellow wolf's hook). The Panzer-FlaK-Kompanie of a Panzer or Panzergrenadier regiment was normally assigned eight 3.7cm self-propelled guns and three quad 2cm self-propelled guns. These could be on any of the various half-track or full-tracked mountings.

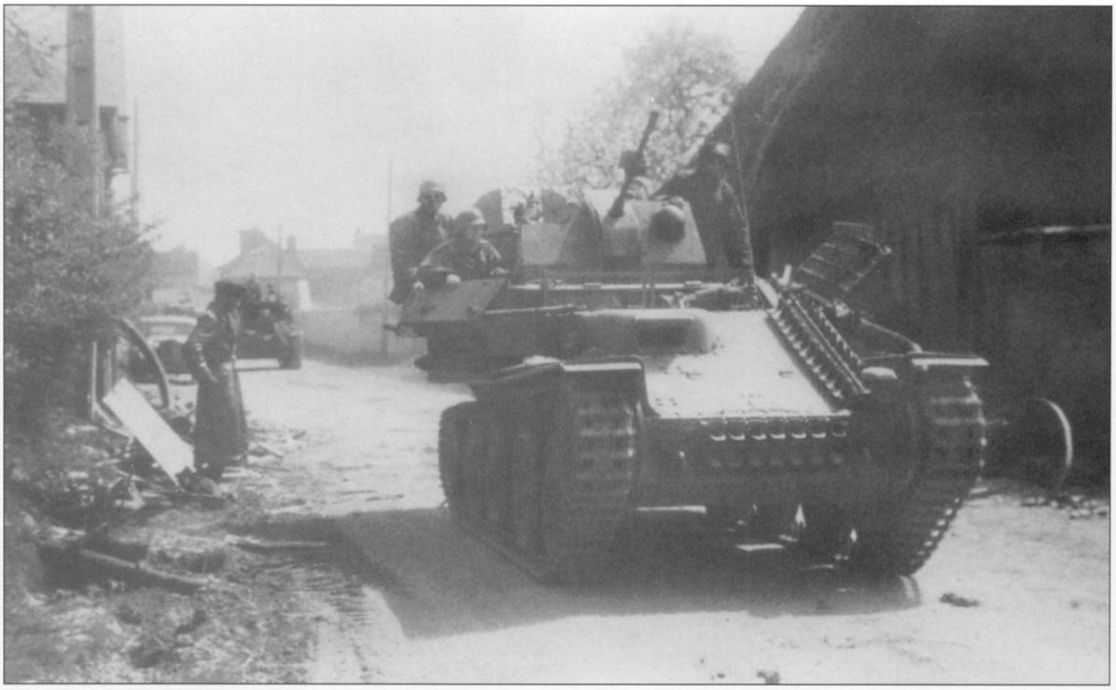


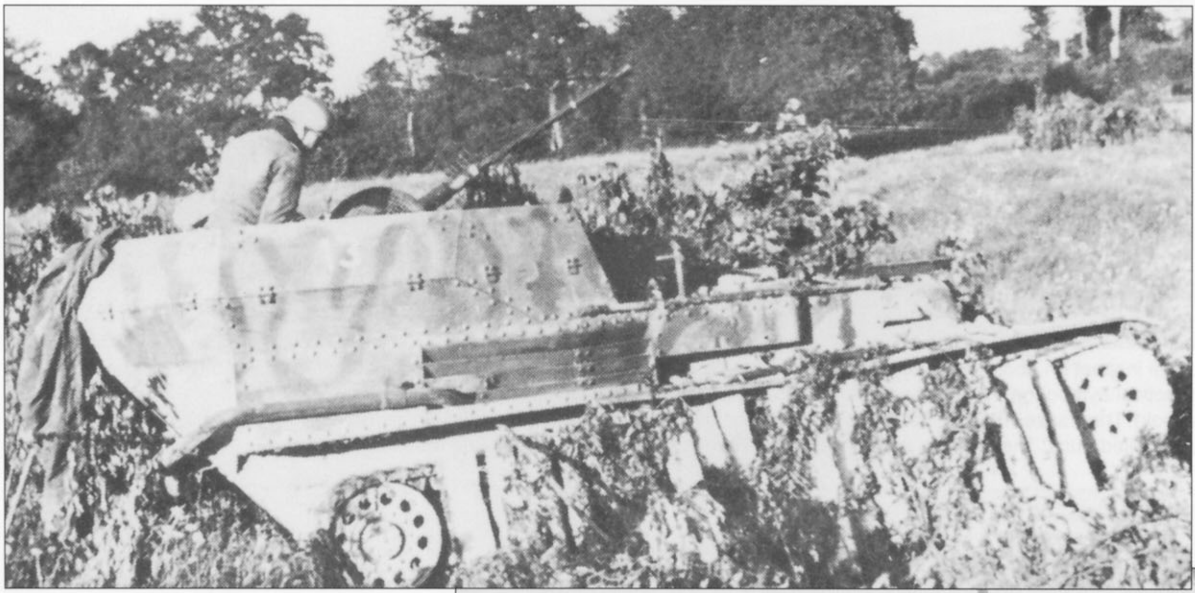
This 2cm Flakvierling is mounted on a halftrack retrofitted with an armored cab and hood, Po River Valley, Italy, April 1945. It appears to have been hit by an air strike resulting in the on-board ammunition and that in the trailer detonating and the fuel burning.



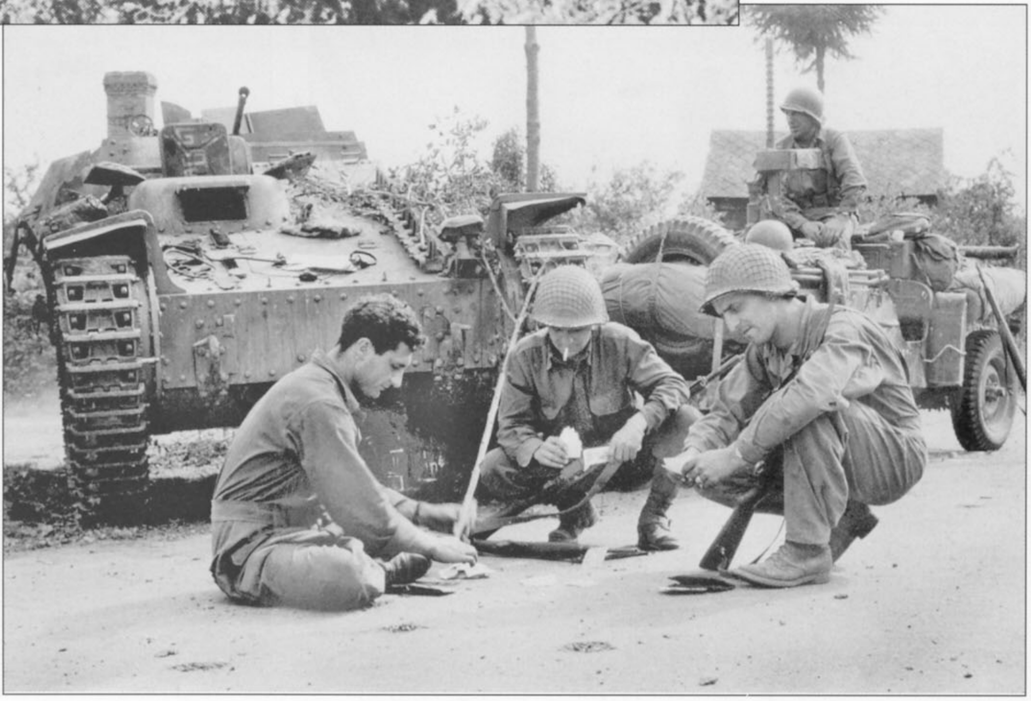
A Flakpanzer 38(t) busts out of the brush. Note that its hinged armored side panels are raised. They were lowered to place the 2cm gun in operation.

A Flakpanzer 38(t) auf Selbstfahrlafette 38(t) Ausf.L (Sd.Kfz.140), from SS-Flak-Abteilung 12 rushes through a dust-filled Norman village in June 1944. The vehicle mounts a 2cm FlaK 38 and carries 1,040 rounds of 2cm ammunition. Built on a Pz.Kpfw.38(t) chassis, it had a crew of four. Only small numbers of this vehicle were built.

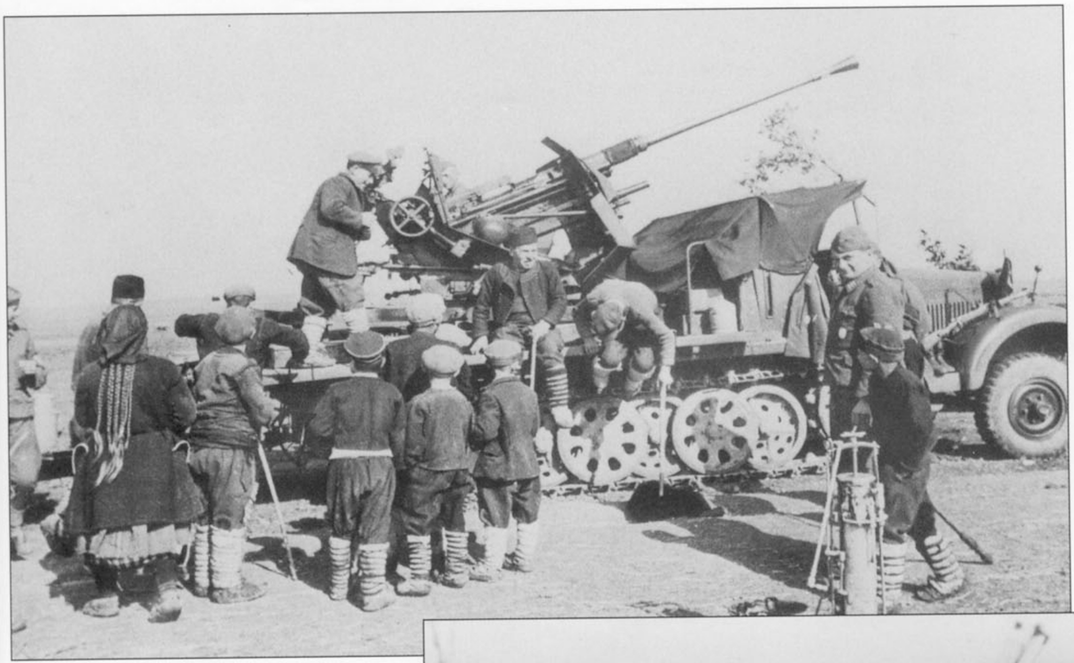




An American soldier inspects an abandoned Flakpanzer 38(t) in France. Firewood from a farmhouse has been stacked along side the tracks to obscure their distinct shape. The crew may have dug a slit trench and parked the vehicle over it and the logs provided extra protection. Most of the camouflaging vegetation has been pulled away to allow the vehicle to be photographed. A swirl-like pattern of green or brown has been sprayed over the dark yellow base.

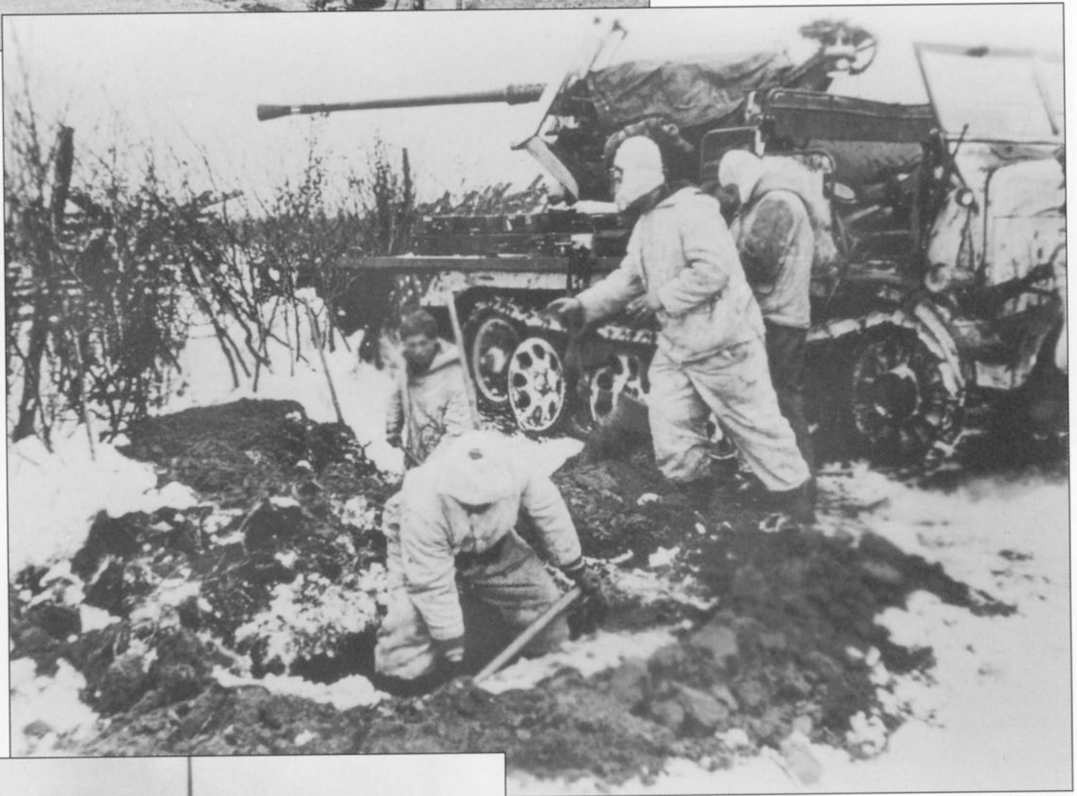


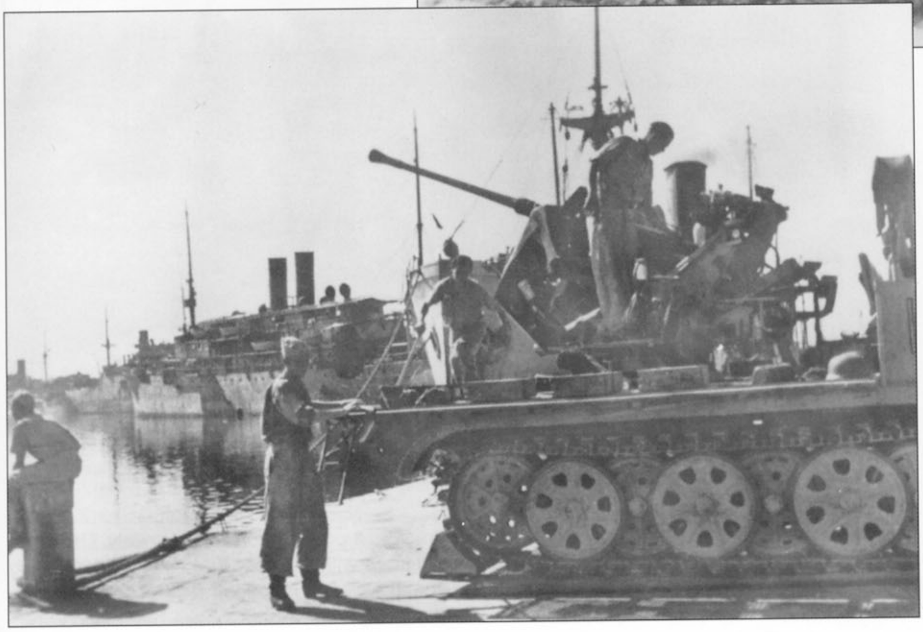
Members of an American regimental intelligence and reconnaissance platoon play a hand of poker as they await orders to move out. An abandoned Flakpanzer 38(t) sits behind them with its 2cm FlaK 38 muzzle visible behind a 20-liter fuel can. The Flakpanzer's small size is demonstrated by comparing it to the 1/4-ton jeep beside it. Note the .50-caliber bullet scars in the pavement in front of the soldier, probably provided by a strafing fighter-bomber.



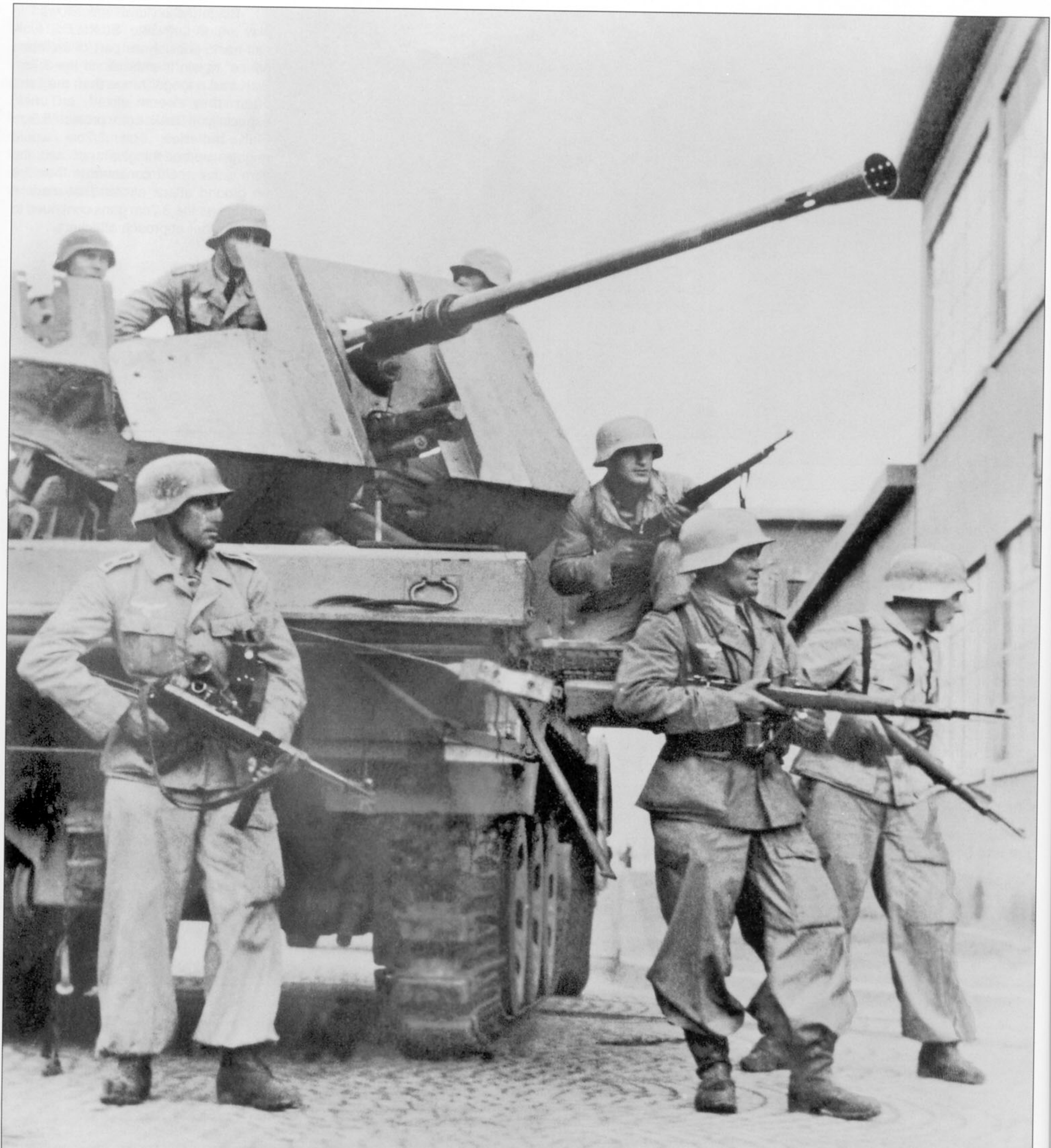
Bulgarian children are allowed to play on a Luftwaffe Sd.Kfz.6/2 FlaK half-track, possibly as part of an "open house" to win friends. Since the 3.7cm FlaK had a longer range than the 2cm, often they were mixed in units, especially if tasked to protect 8.8cm FlaK batteries. The 3.7cm would engage approaching aircraft and the 2cm guns would concentrate their fire on ground attack aircraft that made it through as the 3.7cm guns continued to fire on other approach attackers.

The crew of a Sd.Kfz.6/2 FlaK half-track digs slit trenches around their vehicle. They have parked the whitewashed vehicle within a farm's fenced area overgrown with saplings for what little camouflage they provide. Spoil from such positions were conspicuous from the air. Even if covered with snow by hand the rough texture and churned up surrounding snow was still easily detectable. Russia, winter 1942/43.

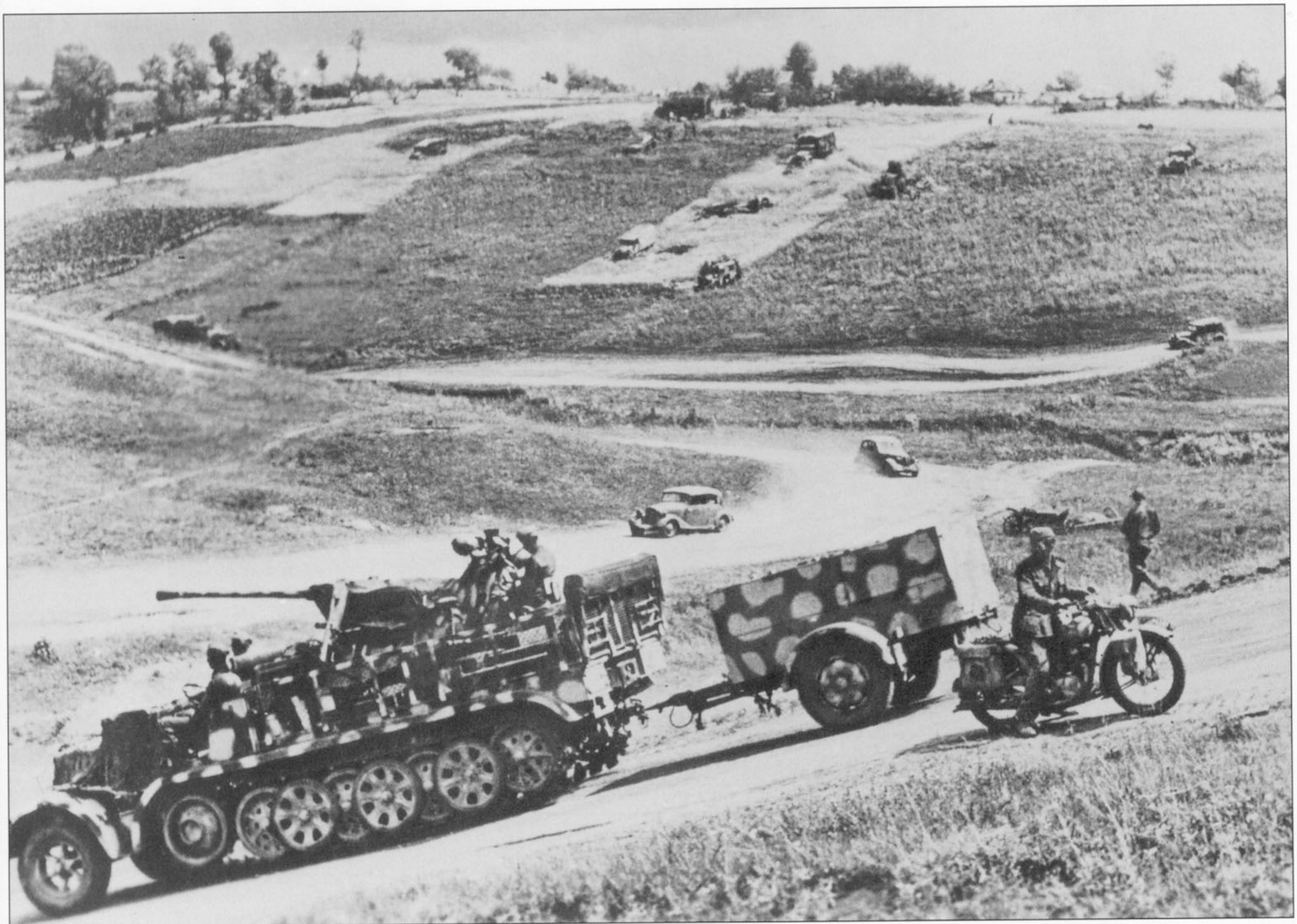




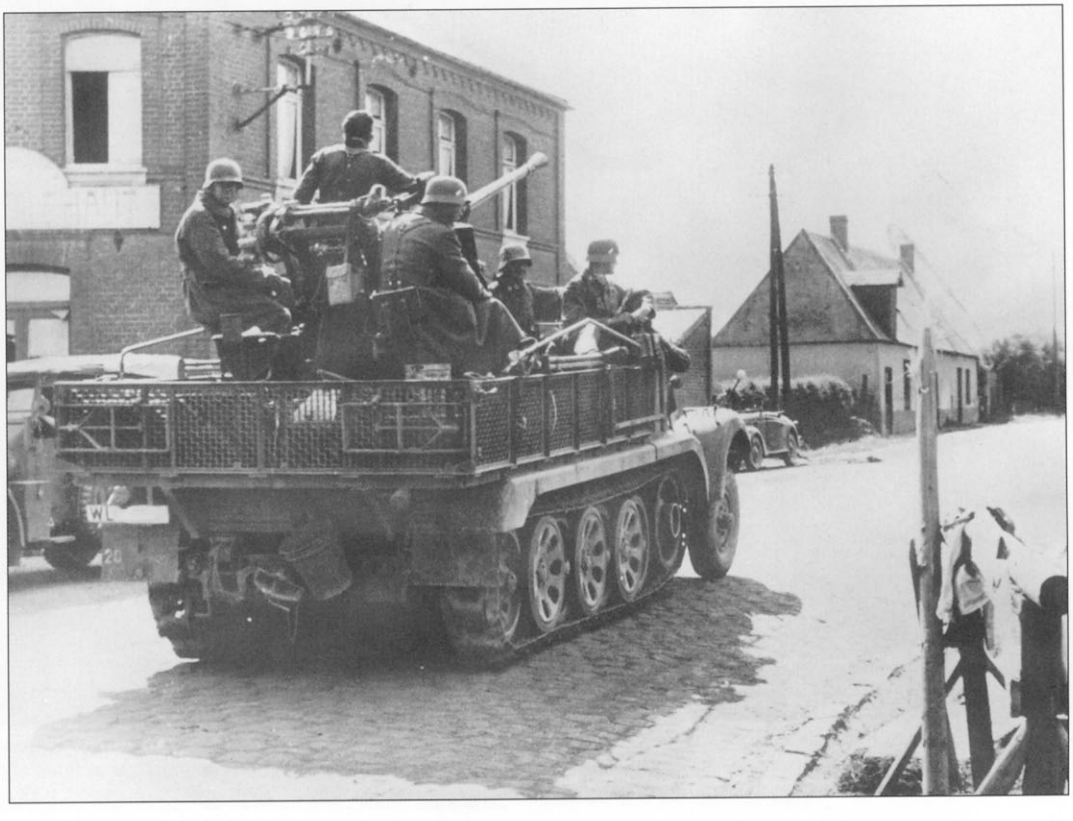
A Luftwaffe Sd.Kfz.7/2 FlaK half-track guards an Italian seaport. Three ammunition cans rest on the track guard; this vehicle lacks droppable sideboards. The gun was fed by six-round clips. Note the track block on the ground. The crew wears tan tropical uniforms.



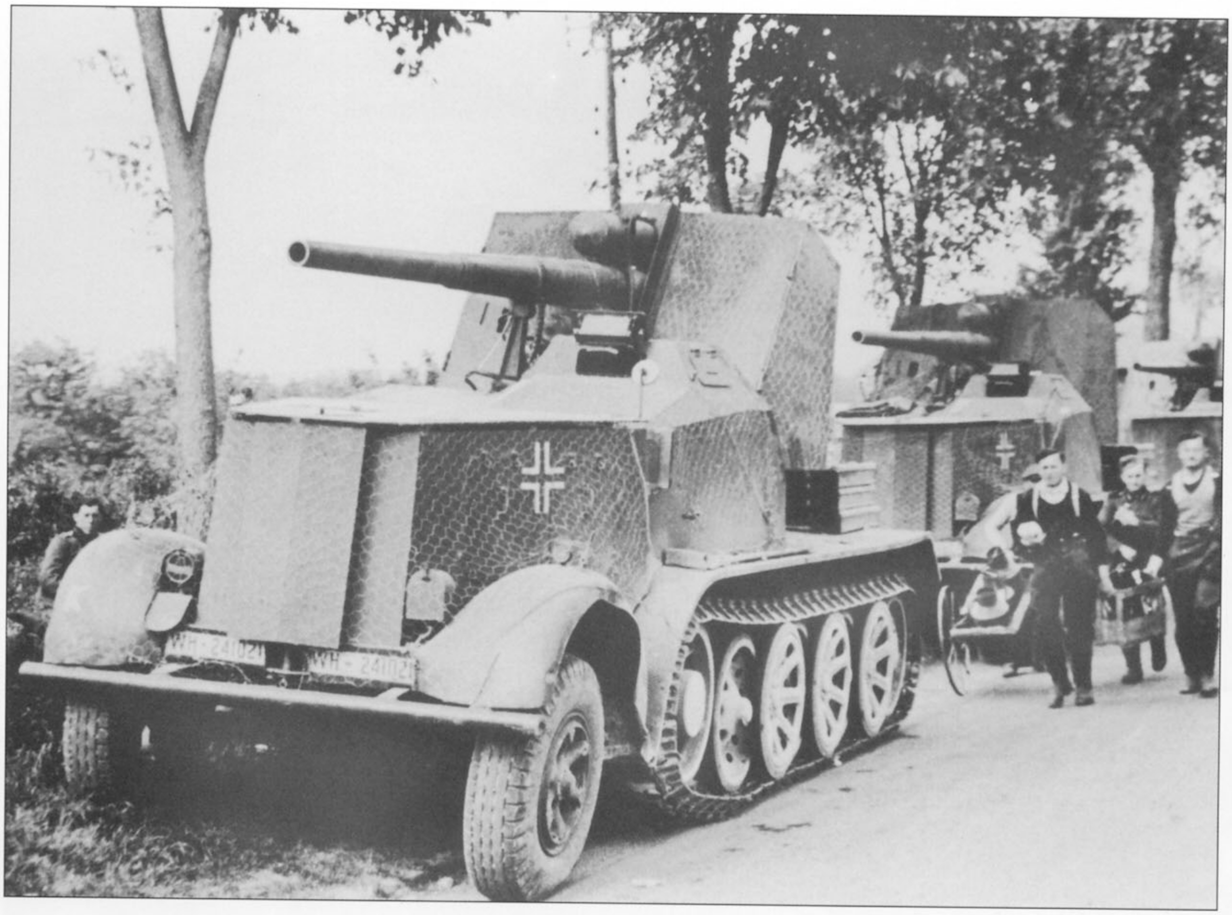
Luftwaffe troops, possibly of Panzer-Division Hermann Göring, dismount to protect a Sd.Kfz.7/2 FlaK half-track in a posed photograph in Italy. The 8-ton Sd.Kfz.7 half-track, normally used as an artillery prime mover, was provided with an armored cab and hood and fitted with a 3.7cm FlaK 36 with 123 being so modified from 1943 to 1945. The separate smaller shield to the left of the gun protects the gunner. The feldwebel (sergeant) to the left, probably the platoon sergeant, is armed with a 9mm MP-40 machine pistol.



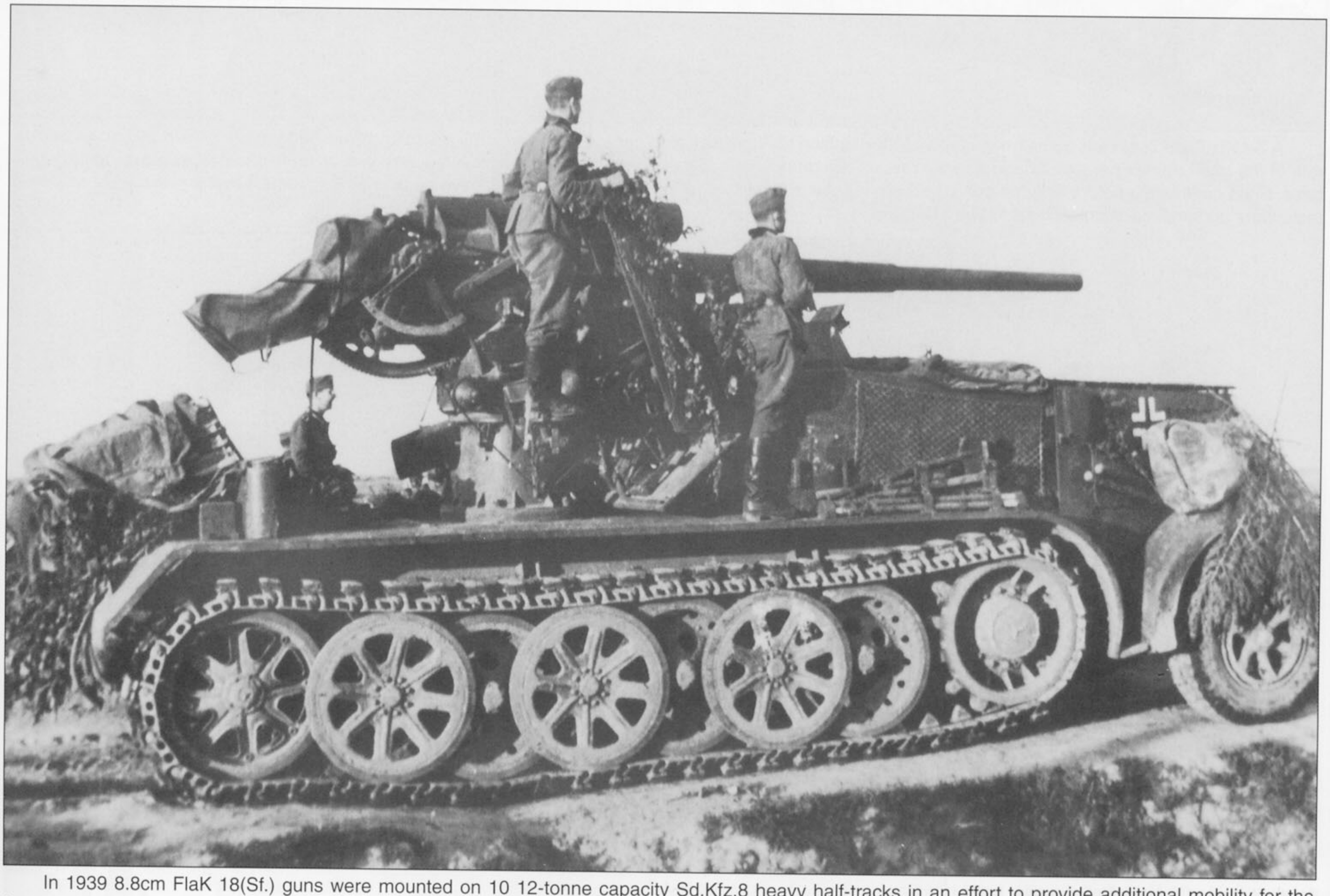
A Sd.Kfz.7/2 3.7cm FlaK 36 half-track pulls its ammunition trailer, which also carried other gun equipment and crew baggage. The FlaK 36 had a practical rate of fire of 80 rounds per minute and a cyclic rate of 160 rounds. The camouflage pattern appears to be dark yellow spots on an olive green on dark gray base. Such contrasting colors and the comparatively regular size of the pattern are not a very effective camouflage scheme. On the hillside are scattered radio vans and staff cars indicating a forward headquarters.



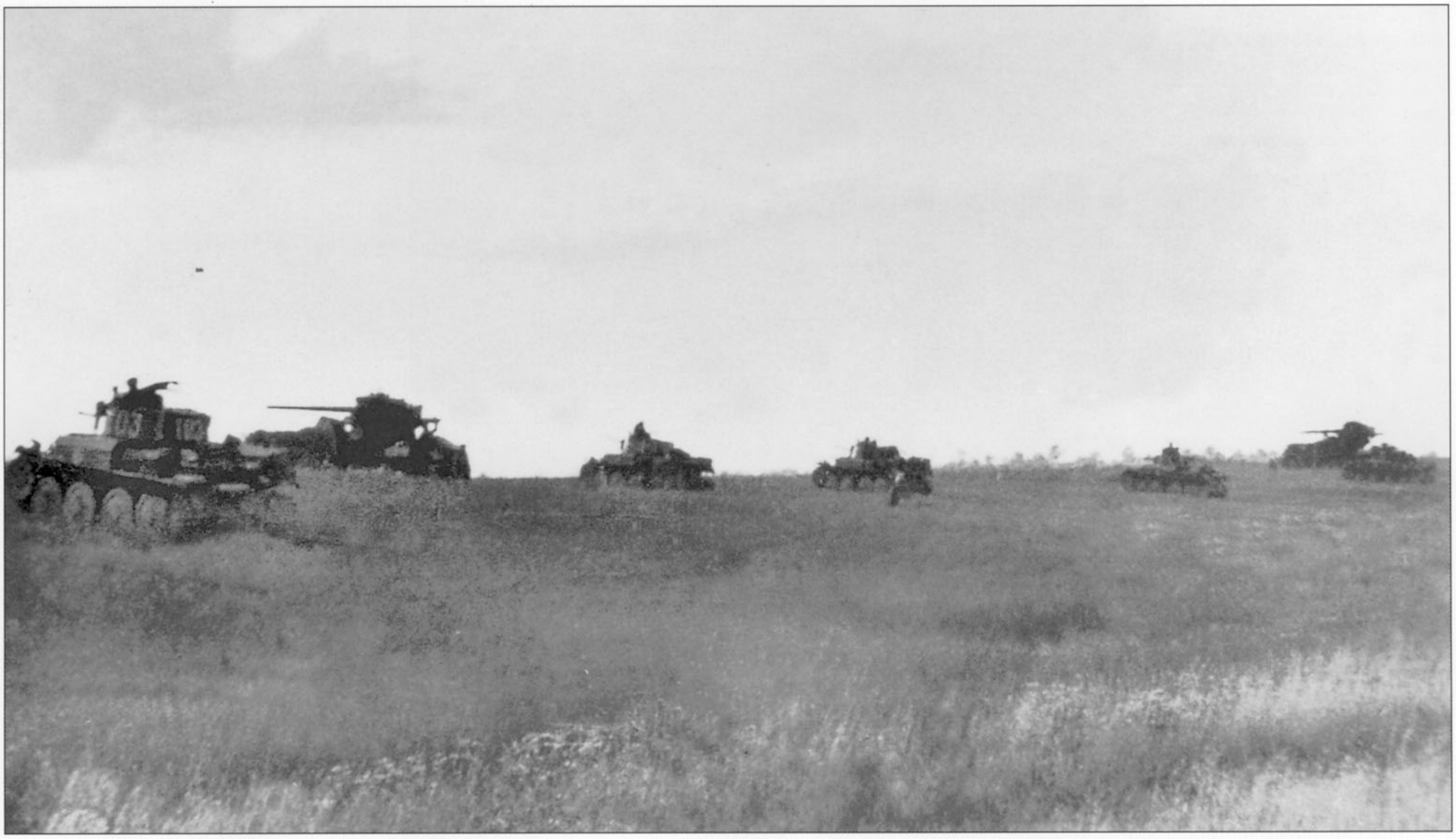
A Luftwaffe Sd.Kfz.7/2 3.7cm FlaK 36 half-track rumbles though a French town. This vehicle lacks the armored cab and hood. Galvanized steel water buckets were commonly carried by many armored fighting vehicle crews and considered essential for washing.



A battery of 8.8cm FlaK 18(Sf.) auf schwerer Zugkraftwagen 12t (Sd.Kfz.8) from s.Pz.Jg.Abt.8 in France, 1940. The gray-painted 12-tonne half-tracks have been covered with chicken wire to attach camouflaging foliage. This vehicle has two registration plates on the front, a not uncommon practice early in the war. Note the early type of blackout driving lights with hinged headlight covers, each with a small slot at the top. Extra crated ammunition is stowed on the track guard. A small white "K" is seen on the left front fender indicating the unit belongs to Panzergruppe von Kleist. The crew appears to be returning to their vehicle with provisions and supplies prior to moving out.

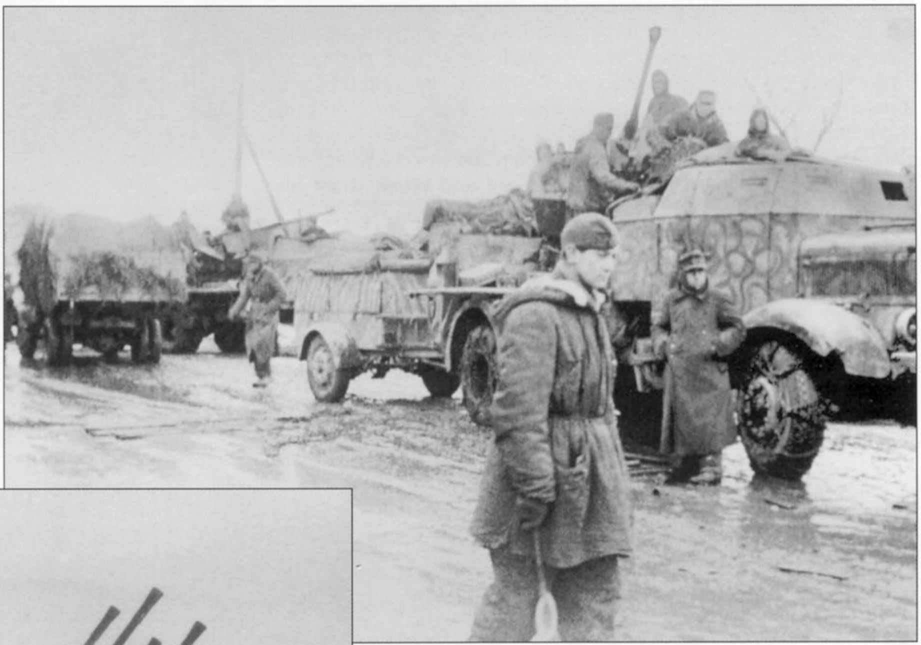


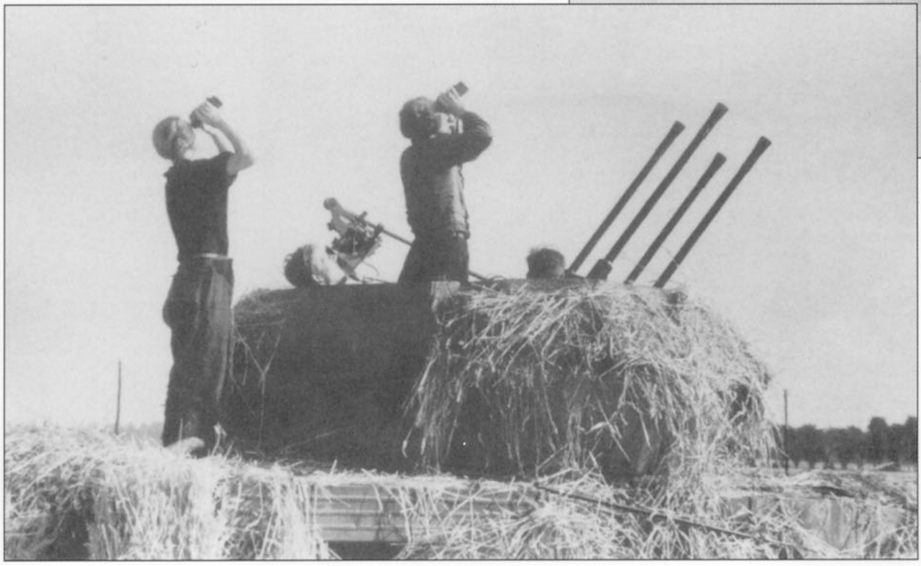
In 1939 8.8cm FlaK 18(Sf.) guns were mounted on 10 12-tonne capacity Sd.Kfz.8 heavy half-tracks in an effort to provide additional mobility for the heavy guns. These were intended for dual role uses of anti-aircraft and anti-tank. The cab and hood were fitted with 14mm armor and two light outrigger jacks were fitted on each side to give the top-heavy weapon stability. Here the outriggers have been stowed.



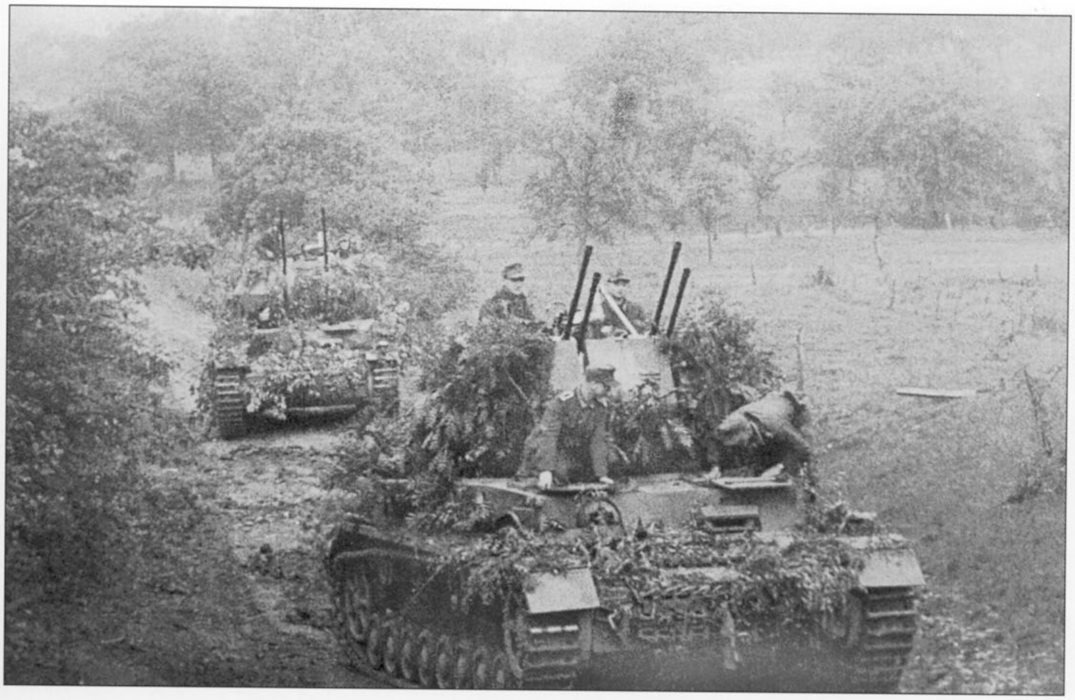
Two 8.8cm FlaK 18(Sf.) auf schwerer Zugkraftwagen advance with Pz.Kpfw.38(t) tanks in Russia. The large, high profile vehicles possessed poor cross-country mobility and their armor protection was completely inadequate for the role. They had no speed or maneuverability for evasive action.

This is a 3.7cm FlaK 36 mounted on a Mercedes-Benz L4500A heavy truck with an armored cab belonging to an unidentified SS unit during the opening days of the Ardennes Offensive. The vehicle and the ammunition trailer have been spray-painted with thin green or brown swirls over the dark yellow base. The Feldgendarmerie soldier in the foreground wears the SS fur lined anorak introduced in February 1943. His traffic wand has a red inner disc with an outer white ring. Another version had a red upper half and white lower.

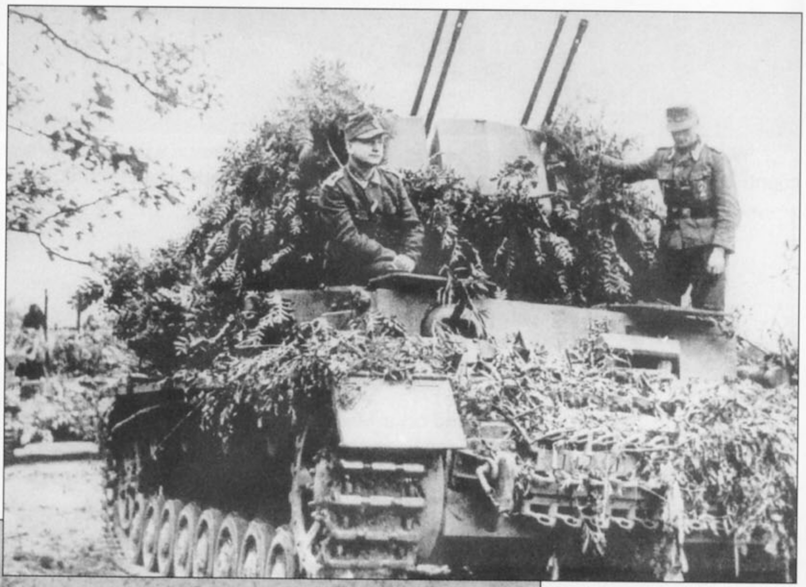


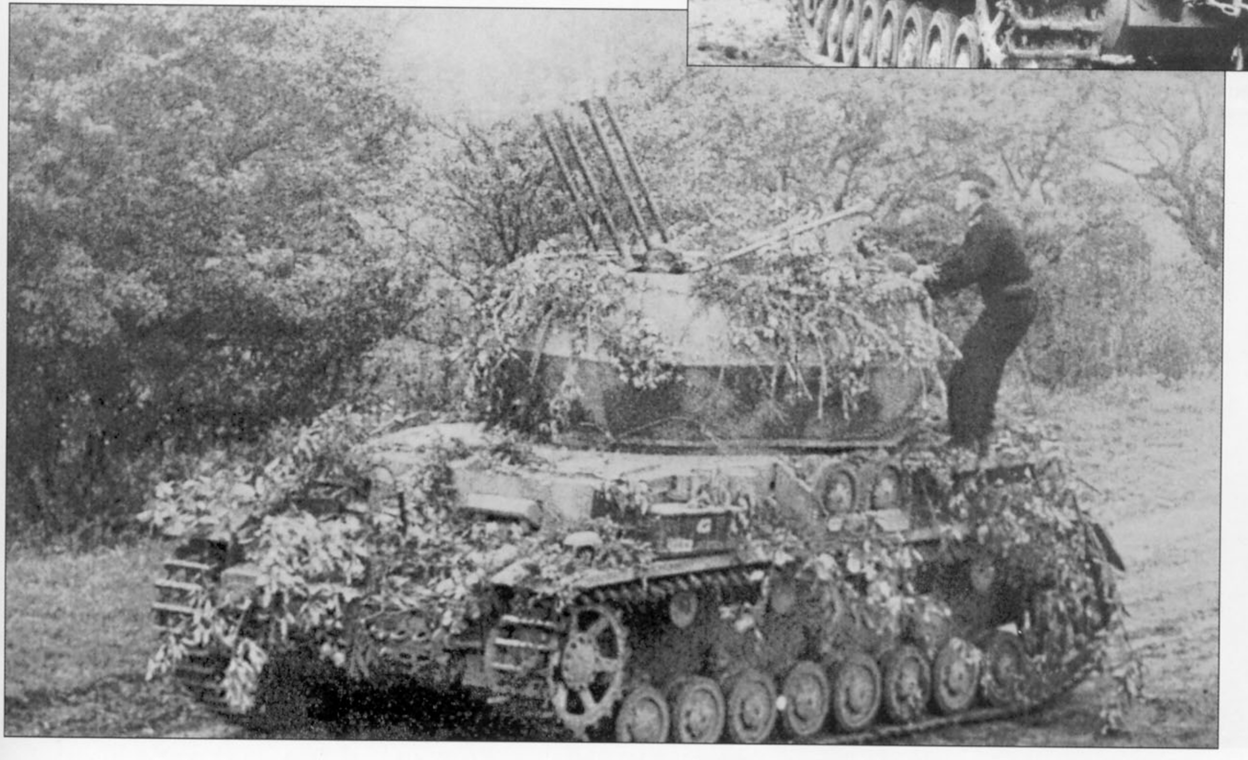


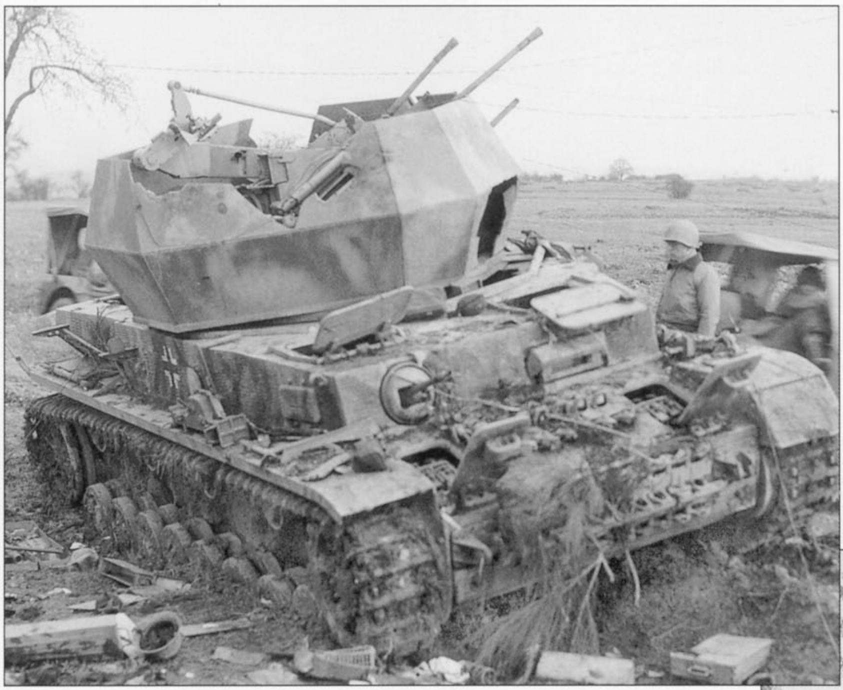
On a warm summer day in Normandy, the crew of 'Wirbelwind' follows the course of a suspicious aircraft. To anti-aircraft troops all aircraft are suspicious until identified as friend or foe. Piled with hay, packed in an open field for a wide field of observation and fire among haystacks it is well camouflaged, but once it moves the hay will fall off. The Flakvisier 40 sighting system can be seen. In this case it was painted the vehicle color, but they were often painted white.



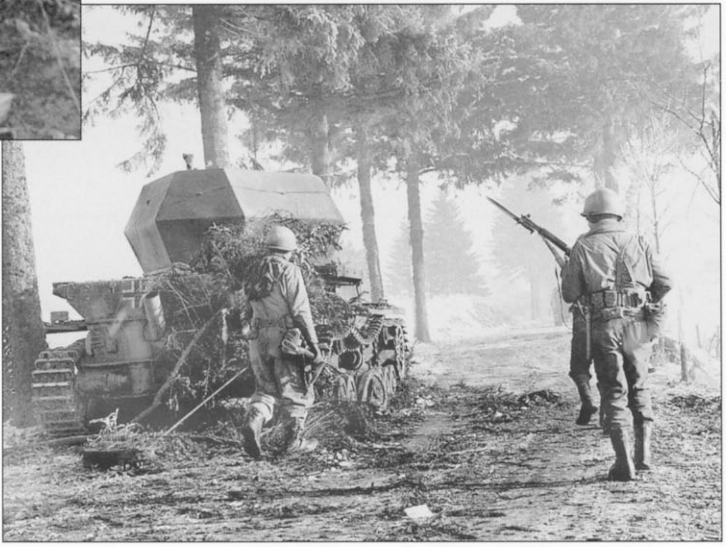
Two Flakpanzer IV 'Wirbelwind' (Whirlwind) somewhere on the Western Front in early October 1944. The first seventeen Flakpanzer IV 'Wirbelwind' were completed in July 1944 and issued to various units beginning in September. These were assembled on rebuilt Pz.Kpfw.IV chassis that had been returned to Germany and mounted the 2cm Flakvierling 38 anti-aircraft gun in a rotating turret. These ones are based on a Pz.Kpfw.IV Ausf.G identifiable by the 30mm armor plates welded to the front of the hull and superstructure. It can be seen how the attached foliage, coupled with its painted camouflage pattern, would aid in concealing the vehicle if it pulled hard into roadside trees and brush when an aircraft appeared.



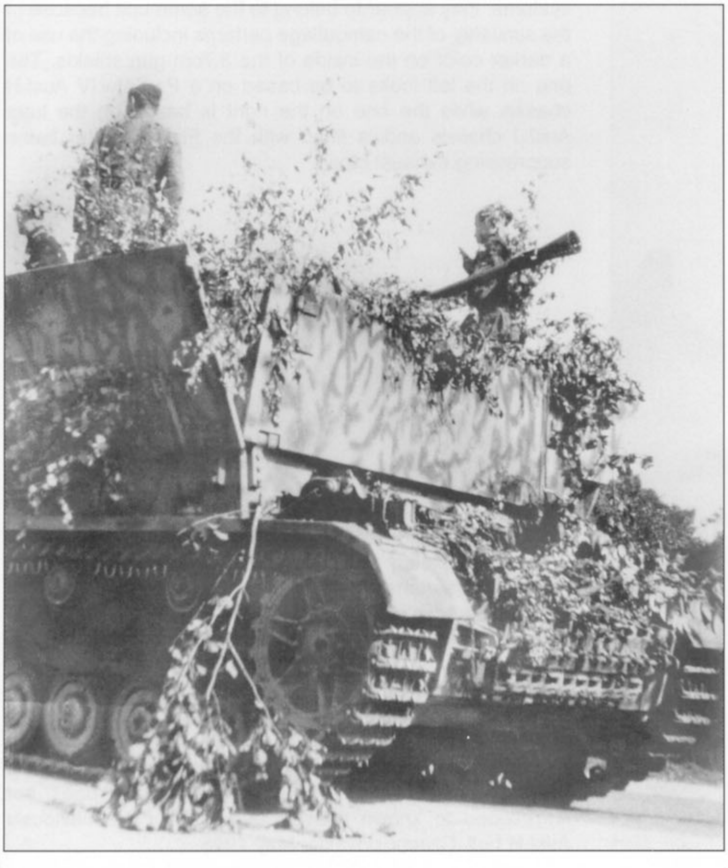


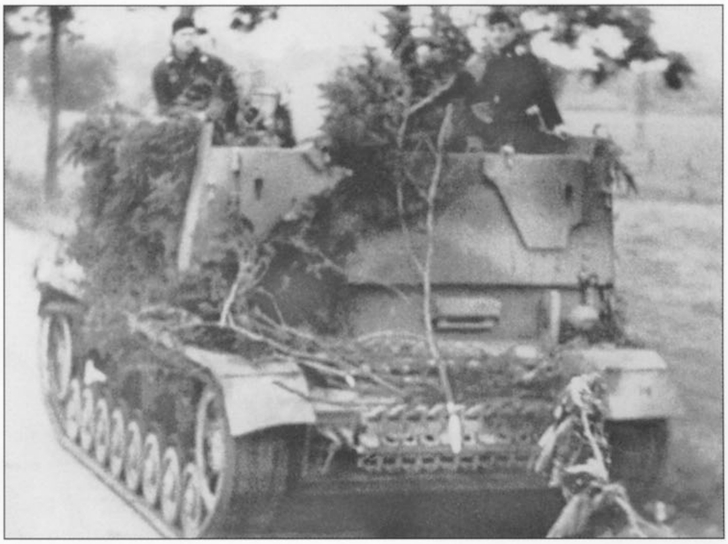


This 'Wirbelwind' appears to have been struck by 5-inch high-velocity aircraft rockets delivered by fighter-bombers. The textured pattern of Zimmerit "anti-magnetic" plaster can be seen on the hull. The plaster was not actually anti-magnetic, but merely provided an insulating material to prevent hand-delivered magnetic antitank shaped-charges from adhering to the vehicle.

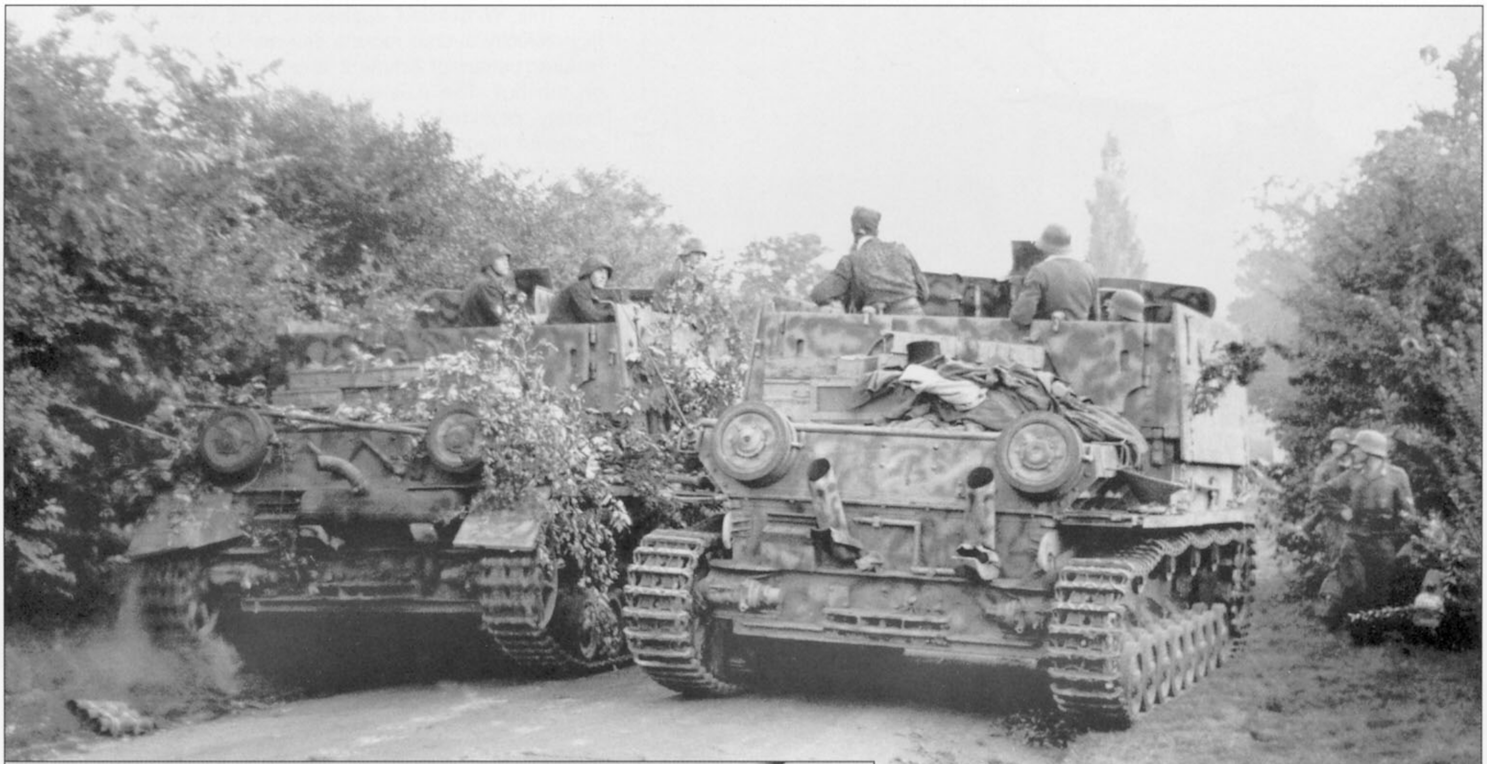


This latte production Flakpanzer IV 'Wirbelwind' was destroyed north of Bastogne in January 1945. It was based on the Pz.Kpfw.IV Ausf.J chassis and is fitted with the Flammentöter flame suppressing exhaust pipes. The impact of the round that knocked out this vehicle has blown off one of the four steel return rollers and destroyed two roadwheels.

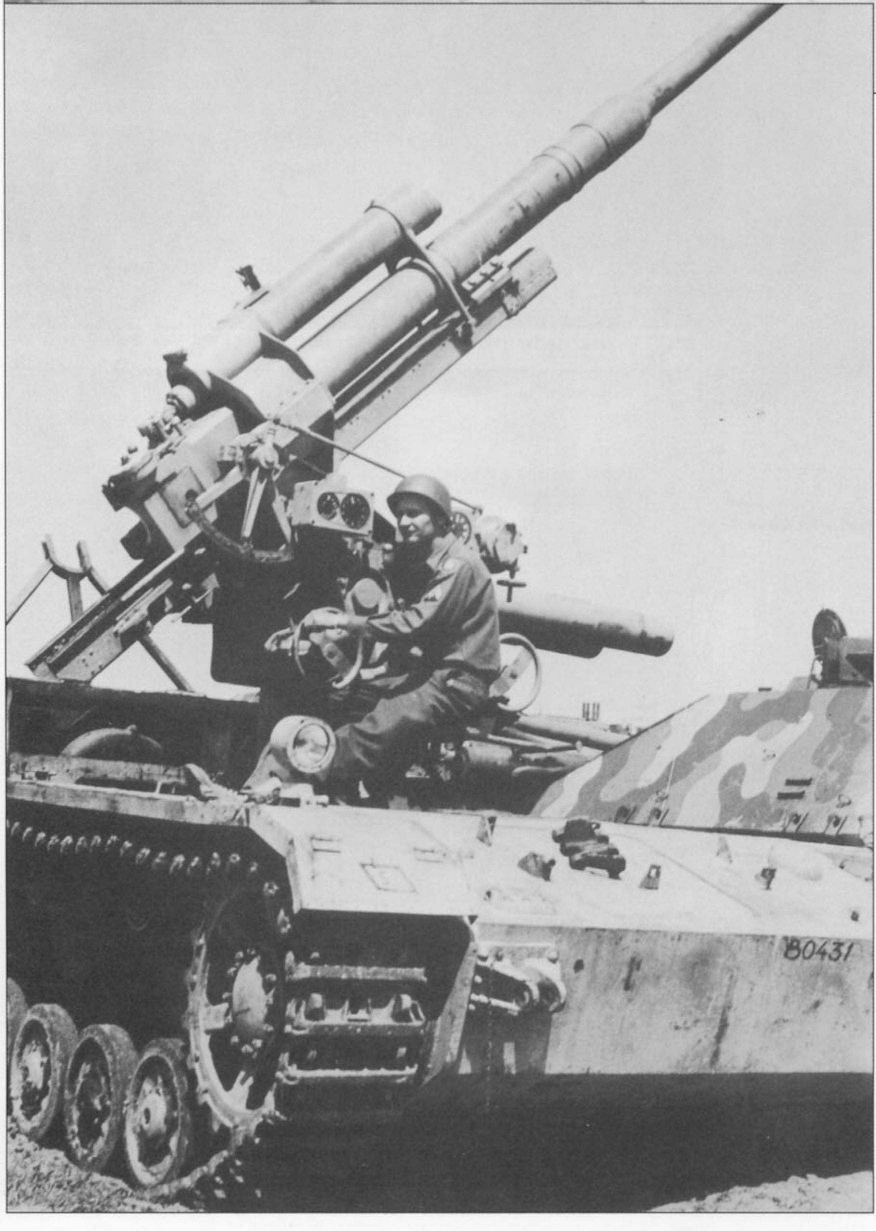




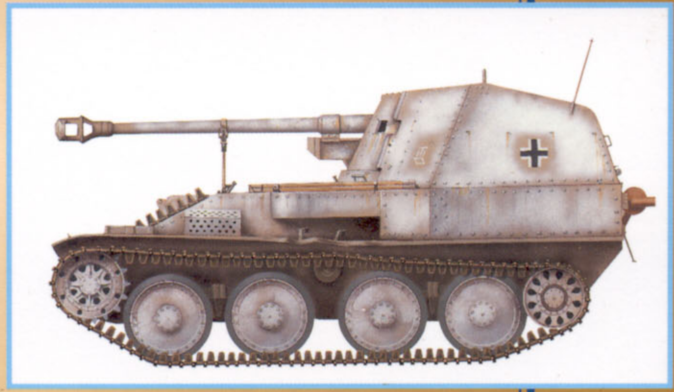
These photos illustrate the 3.7cm FlaK 43 mounted on a Pz.Kpfw.IV chassis, the 'Möbelwagen' (furniture wagon), the 3.7cm FlaK auf Fahrgestell Panzerkampfwagen IV (Sf.) (Sd.Kfz.161/3). Initially, the first 20 superstructures had double 12mm shields, the next 25 had double 10mm shields and the remainder were fitted with single 25mm shields. While moving the shields were raised. This provided some protection to the crew for shell bursts on all four sides. The gun retained its own shield though to offer some forward protection to the crew when the vehicle shields were lowered. When the forward shield was raised the gun had to be elevated above the shield. The shields had to be lowered in order to operate the gun, as it could not rotate when the shields were up. Beneath the fir branches the vehicle has been painted green and brown over the dark yellow base.

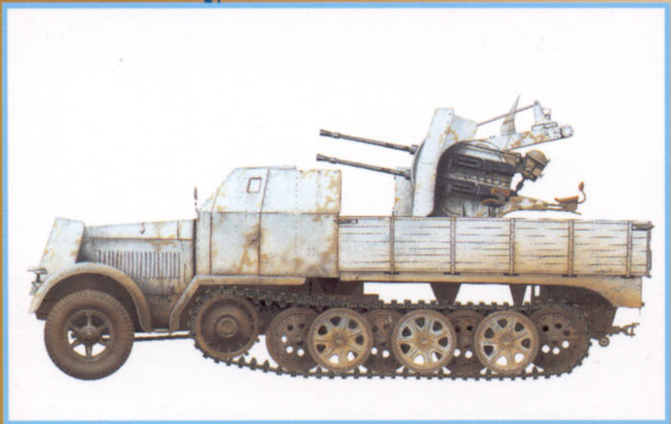


The 'Möbelwagen' was introduced in June 1944 with the first 24 assigned to Panzer divisions in the West where the fighter-bomber threat was most serious. The 3.7cm FlaK 43 L/60 gun was introduced in 1943. Externally it was similar to the earlier 3.7cm FlaK 18, 36, and 37, but it was gas operated rather than recoil as the earlier models. A load of 416 rounds of 3.7cm ammunition was standard. Here, 'Möbelwagen' crews shout encouragement to one another as they pass on a Normandy road. While the vehicles are of different versions, note the rear ends and different exhaust systems, they appear to belong to the same unit because of the similarity of the camouflage patterns including the use of a darker color on the inside of the 3.7cm gun shields._The one on the left looks to be based on a Pz.Kpfw.IV Ausf.H chassis while the one on the right is based on the later Ausf.J chassis and is fitted with the Flammentöter flame suppressing exhaust pipes.



This is a field expedient effort to mount an 8.8cm FlaK 36 on a completely open Pz.Kpfw.IV Ausf.H chassis. A unit using a battle damaged tank chassis built this weapon. Even the driver's compartment is open. It was necessary to remove the entire superstructure above the track guards in order to provide space for the gun and crew. The gun's shield was removed to reduce its weight and top-heaviness. The black tactical symbol on the front right fender indicates the weapon was assigned to a heavy flak battery of a Panzer division's flak battalion. What appears to be a chassis number painted on the front plate does not correspond to known chassis numbers for the obviously Ausf.H hull. Czechoslovakia, May 1945.





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